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American Journal of Diseases of Children

OLUME 69 JANUARY 1945 NUMBER 1

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RANDOM THOUGHTS ON THE POSITION OF PEDIATRICS

PRESIDENTIAL ADDRESS

JAMES L. GAMBLE, M.D.

BOSTON

The first item on this program is an overstatement. I am not qualified to give an address. I ve been so long immured in a laboratory that annot undertake to offer a survey of that wide ction of medicine which is called pediatrics, r can I attempt to predict even its proximal ture. I am mortified that this is the case, beuse, even to me, it is evident that in these ucial times the organization of pediatrics in l of its features urgently needs examination. owever, it is not possible to pass through enty-three years of membership in this society ithout having some thoughts about pediatrics yond the buret. So I shall offer a few inrmal reflections.

One of these is that pediatricians should be ertly aware of pediatrics' debt to the comunity. Pediatrics has been given a generous ceptance. Parents who would never think of eriodic medical examination for themselves inst on routine watchfulness over the health of eir children. Pediatricians owe to the responveness of the community their great successes preventive medicine. To be sure, it is they ho taught the community this attitude, but so ccessfully that it can now be said that the comunity in large measure propels pediatrics. Havg got this benevolent monster widely awake ediatricians are insistently commanded to proide more morsels of progress in defense of an ptimal physiologic and sociologic position for e child.

This assignment is so large that I wonder hether it is proper to call pediatrics a medical ecialty. If internal medicine is not a specialty, ediatrics is not. Pediatrics is simply the prace of internal medicine over the period of rowth and development. It is the phenomenon alled growth which gives pediatricians their rovince and conditions all of their undertakings. he diversity of material before the pediatrician as wide as, in fact wider than, that which cononts the internist, and there is never an end his education in dealing with it. It is my mpression that the community does not wish to egard pediatricians as specialists. What the community seems to want is physicians, in the full sense of the word, for children. This desire is at present realizable only in communities of sufficient size, but with regional organization of medical care it can be hoped that eventually there will be doctors for children almost everywhere. And so I find the word specialty a narrow designation, which does not suit the width of the future of pediatrics.

There is another word, used in a sense of disparagement, which I am inclined to defend. It is asserted by the medical isolationists that if the pediatrician accepts all of the commitments which an admiring community would like to impose, he will become a puericulturist. If one accepts the premise that the pediatrician's first responsibility is to preserve, as nearly as possible, the correct progress of his patient along the path of growth and development, one is obliged to accept this ungainly word, but by the same token one need not use it, because it adds nothing to the content of the word pediatrician. Because of the dependent position of the child and his unfinished physical and mental development, management of disease, particularly over the period of recovery, often requires social and educational adjustments in order to minimize disturbance of an orderly progress toward adulthood. The pediatrician cannot reasonably refuse to use the assistance which the community is so anxious to provide and on the organization and effectiveness of which it so much desires his judgment. So it would seem that the pediatrician must consent to endure a certain amount of companionship with nonmedical devoteees of growth and development. If he is gracious about this the organization of medical care can be greatly advanced.

When the economic problem of equitable provision of medical care is approached, one finds more debate about words. Because of the expensiveness of modern procedures in diagnosis and therapy most people cannot afford optimal medical care. So pediatricians have clearly before them a problem which can be solved only by subsidy. This the community is very willing to provide. The method of application of the subsidy seems to be the main ob-

Read at the Fifty-Fifth Annual Meeting of the merican Pediatric Society, Sept. 26, 1944.

stacle. Subsidy connotes socialization, and this is a horrendous word when applied to the practice of medicine, although it does not provoke qualms when it supports institutionalized care of patients. So the community is perplexed to know how to transfer to the physician his just compensation when his palms are firmly folded in uncompromising devotion to the doctrine of competitive practice.

It would seem to the cloistered observer that this and other items of impasse might be overcome by a mild revolt against domination by words. Words, it may be supposed, should be used to describe concepts, which they never quite do. Words by themselves should not produce concepts, but they very often do. Readjustment need not imply revolution. The necessary reorganization of medical care can probably be accomplished by a small increase in the socialization of medicine beyond the extent which has been long and complacently accepted. So I venture to suggest a more carefree and less subservient attitude toward words.

"When I use a word," said Humpty Dumpty in a slightly scornful tone, "it means just what I intend it to mean, neither more nor less."

"The question is," said Alice, "how you can make words mean so many different things."

"The question is," said Humpty Dumpty, "who is to be master; that is all."

As regards an approach to this problem, my thoughts come only from the narrow groove of my own experience. I should suppose that the problem of the organization of medical care to the best advantage of the community ought to be studied with the same objectivity which has revealed the organization of extracellular fluid for its services to the body as a whole. Lawrence Henderson, after contemplating blood as an automatically stabilized physicochemical system, used to dream of identifying the components of equilibrium in the social organism. This is not a fanciful analogy. The social organism has the same tough resilience that one admires in a biochemical system: This resilience consists of the ability to accept distortion on the strength of an elastic resistance which when adverse circumstances are removed, brings the parts of the system back to their optimal positions. Physicians are asked to examine the distortion which has developed in the medical care region of the social system. Sociologic data have a lamentable lack of precision, but they must be used as well as possible. The community awaits solution of this problem with growing impatience.

Never having had experience with the exigencies of private practice, I realize my temerity in presenting these thoughts. They are, however, thoughts without tentacles; so they do not produce convictions. This being the ca I trust you have not found them irritant. wish you construe them as a confident exp tation that pediatricians will examine this pr lem temperately and objectively and then ma the socioeconomic adjustments which their fi ings indicate with the same willingness they ha always displayed in altering medical methodolo according to new information gained from t study of disease.

I am well aware that this assignment in r search, which must be undertaken by pediatricia as a body, is an extremely difficult one. In fa to one accustomed to the closely measurable da produced by the methods of chemistry, it see appallingly so. Obviously progress must tentative and must be largely carried out by process of trial and error. Above all things pr cipitate postulation will need to be avoide Even in the laboratory, pride in postulation a serious sin. Under pretext of sermonizi about this, I shall now, to your relief and mi leave the language of presidential pronoun ment and come down to the vernacular of bo fluid physiology in order to relate some rece and humbling experiences.

In the course of a study, undertaken wi Dr. Allan Butler, of the extent to which wat can be gained from ingested sea water, we in dentally learned that when sea water is giv to a fasting subject the rate of loss of sodiu from the body is reduced. This is not surpri ing, because of the large intake of sodium whi sea water provides. What did surprise us w that when we gave dextrose along with the s water a much larger reduction of loss of sodiu was observed. In fact, the sodium balance of t body usually became measurably positive. The experiments with sea water were carried out the basis of a limited intake of fresh water order to obtain the maximal concentration solutes in the urine, which is necessary for gain of water from sea water. Since the effe of dextrose on the conservation of sodium whi we observed has an obvious relevance to t premises of therapy by means of fluids admin stered parenterally, we thought it worth whi to study this effect in the presence of an abunda intake of water.

Chart 1 shows the data obtained from 1 of o subjects over four six day periods of study. T lowest curve describes the progress of loss sodium during a period of fasting. By the en of the period the deficit of sodium was approx mately 300 milliequivalents, and this measured withdrawal of about 2 liters of extracellul fluid. When we attempted to prevent this lo of sodium by providing an approximately equiv lent intake in the form of sodium chloride, almo

thing was gained over the first several days. hen we began to have small positive balances, hich to a slight extent repaired the deficit for e early part of the period. When dextrose was ven we found a progressive loss of sodium, t at a rate which produced a final deficit of

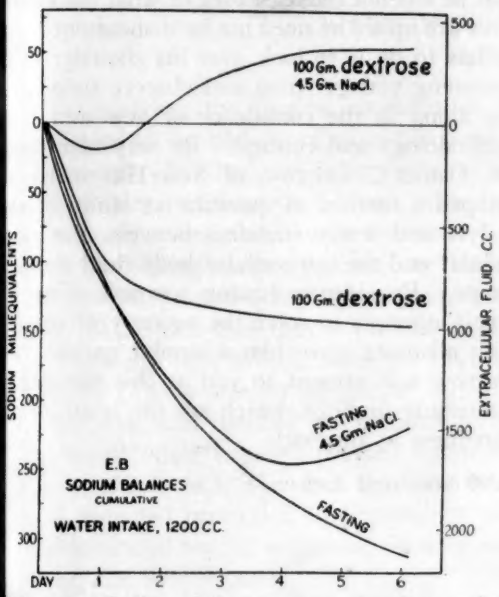

Chart 1.—Sodium balances over six day periods, owing change from values found for fasting produced ingestion of sodium chloride, of dextrose and of dium chloride and dextrose together.

out one-half the value found for the fasting riod. This deficit was also less than was und when an intake of sodium was supplied. hen we gave sodium chloride and dextrose gether there was after the first day no deficit sodium; in other words, the volume of extra-llular fluid was completely sustained.

I have always supposed and have consistently ught my students that although dextrose so-tion can cover current obligatory expenditures water by the body, it cannot prevent or limit process of loss of water which involves with-awal of extracellular electrolyte: Only solution sodium chloride can do that. From these ta it is seen quite clearly that dextrose does nserve extracellular fluid, and to a larger ex-nt than does an intake of sodium chloride. So re is a badly broken postulation. It was de-ved from the well established observation that a ficit of extracellular fluid, once it has de-loped, cannot be repaired by dextrose solution. he lost electrolyte must be replaced. The ssibility that the metabolism of dextrose might some way or other alter the rate of loss of dium from the body was not thought of. So is was an incautious postulation which met a served fate, with the pleasing result that the physiology of body fluids became more intricate and therefore more interesting.

I have recently lost another postulation, an old and favorite one. Because of the larger quantity of sodium than of chloride in the intestinal digestive secretions, one expects to find a larger loss of sodium than of chloride from the body when diarrhea causes a wastage of these secretions. It follows that one does not expect to find a recession of chloride in the plasma with resulting alkalosis, such as that which develops when chloride is lost by the vomiting of gastric secretions. Recently I encountered an infant who directly disobeyed these simple and apparently axiomatic rules for diarrheal disease. He was 14 months old and had voluminous watery diarrhea, which began soon after birth. His stomach was sound; so he was able to take quite large feedings without vomiting. The plasma chloride was found greatly reduced and the bicarbonate correspondingly extended. This surprising combination of alkalosis and diarrhea in the absence of vomiting led to measurement of sodium and chloride in the stools, and chloride was found in large excess over sodium. In chart 2 *A* the measurements of outgo of sodium and of chloride are from another patient with chronic diarrhea and will serve to show the orthodox findings: a larger loss of sodium than

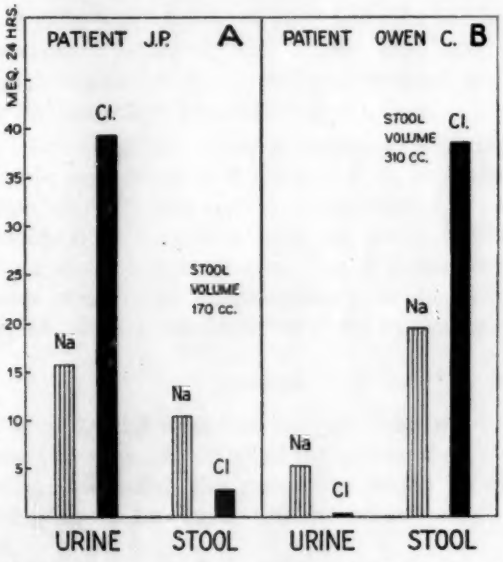

Chart 2.—Outgo of sodium and of chloride in the urine and in the stools. *A*, usual findings in chronic diarrhea. *B*, reversal of usual relationships for patient O. C.

of chloride in the stool, and in the urine a much larger removal of chloride than of sodium. The measurements in chart 2 *B* are from our nonconformist patient, and they are just the other way round: There is almost no chloride in the urine; practically all of the outgo is in the stool,

and it is much larger than the loss of sodium. This reversal of the sodium-chloride ratio in the stool might be explained by an overabundant secretion of gastric juice. This, however, could not be demonstrated. Duodenal secretions were also examined and were found to be chemically normal. When it was undertaken to raise the level of plasma chloride by providing a supplementary intake of sodium chloride a small elevation could be sustained, but at the cost of a huge increase in the volume of the stools. Even when chloride was placed behind the gastrointestinal tract by giving clyses of isotonic solution of sodium chloride it was rapidly removed in the stools. Quite evidently there was here a disturbance of the control of water and of sodium chloride which is beyond effects referable to diarrhea; and so, instead of simplicity, which is the aim and promise of postulation, one is compelled to recognize complexity. But one has the solace of more space for the pleasures of curiosity. This patient was under our care for more than a year; so we had a long opportunity to find the underlying defect in electrolyte metabolism, and we failed completely.

When a body fluid physiologist grows old and his pet postulations begin to tumble about his and he finds himself in a situation such as I have just described, in which he is obliged to admit that he has not the least idea of what the electrolytes are up to, he need not be disheartened. All he has to do is to look over his shoulder at the oncoming younger men and observe them striding along in the confidence of new and better methodology and concept. By way of instance, Dr. Daniel C. Darrow, of New Haven, has developed a method of quantitative study of electrolyte and water transfers between the extracellular and the intracellular body fluid compartments. Providence, having wearied of my decrepit attempts to solve the mystery of diarrhea with alkalosis, gave him a similar patient. Dr. Darrow will present to you at this meeting his interesting findings, which are the fruits of preparedness in approach.

300 Longwood Avenue.

ALUM-PRECIPITATED DIPHTHERIA TOXOID FOR INOCULATION OF PERSONS EXPOSED TO WHOOPING COUGH

JORGE MUÑOZ TURNBULL, M.D.*
MEXICO, MEXICO

While studying the clinical modification of whooping cough by the use of alum-precipitated diphtheria toxoid, I had the opportunity to observe 9 children exposed to siblings with pertussis who were inoculated with this toxoid at the time the siblings began to cough or before, and who were protected from whooping cough in spite of the fact that they continued to live with the siblings who had the ailment. This fact at the time (1943) seemed significant, although not conclusive, and induced me to institute observations of other exposed persons under the same circumstances. The fact that the latter subjects obtained protection by inoculation with alum-precipitated toxoid supported the idea suggested by the first 9 cases.

Up to the present time I have observed 61 exposed children under conditions that do not warrant the slightest doubt that opportunity for contagion existed, since all of these children lived in the same houses and many slept in the same bedrooms as 1 or more siblings who had whooping cough.

In addition, there were 4 persons exposed to pertussis in whom the disease developed despite inoculation at the time the siblings began to cough or before. Although these persons had a mild form of the disease, there is no question of protection. However, the clinical modifications of the disease in these patients should be noted: Its duration never exceeded three weeks, and the intensity of the disease was less than it was in children who had not been inoculated.

I propose the hypothesis of synergy of two antigens—in these cases, Bacillus pertussis and diphtheria toxoid—to explain the improved immunization response. At the present time I believe that is how the diphtheria toxoid acts on children already infected with whooping cough.

METHOD

The criteria used in classifying a child as exposed were as follows: 1. One or more of his brothers and sisters must have whooping cough with all its clinical characteristics. These characteristics were enumerated in a former communication [1]; at least one week of spasmodic cough; vomiting; congestion of the face during the coughing spell, and a final loud inspiration. 2. Another frequent factor of importance and essential was that of epidemic—the coexistence of 2 or more cases of whooping cough in the same house. 3. A child was considered exposed if he had been living intimately with infected persons during the catarrhal period, especially if the contact was made at the beginning of the period of spasmodic cough.

A child was considered protected if he had been inoculated before or just at the time that his cough began (of course without spasms) and if he did not cough for more than ten days.

The doses of alum-precipitated diphtheria toxoid used were as follows: 0.5 cc. for infants from birth to the age of 3 months; 1 cc. for infants from 3 to 12 months old, and 1.5 cc. for those above 1 year of age. The injections were made every week subcutaneously in the deltoid region, with a maximum of three injections.

RESULTS

Most of the protected subjects who were exposed to pertussis coughed for several days after being inoculated, the maximum length of time being six to ten days. Others did not cough at all.

In regard to subjects who coughed for a few days, it is my impression, as yet unsubstantiated, that they were protected in the best possible manner, because if they had, as a matter of fact, such a mild form of pertussis that it could not be recognized were it not for the antecedent pos-

* Of the staff of the Hospital Infantil de México.

Second communication. Previous experiments with alum-precipitated diphtheria toxoid were presented before the Mexican Society of Pediatrics (Sept. 4, 1942) and the Mexican Section of the American Academy of Pediatrics (July 1942) and were reported in the Journal of Pediatrics (Muñoz Turnbull, J., and Varela, G.: Clinical Modification of Whooping Cough by Use of Alum-Precipitated Diphtheria Toxoid, J. Pediat. **24**: 46-52 [Jan.] 1944).

1. Muñoz Turnbull and Varela: J. Pediat. **24**:46-52 (Jan.) 1944.

sibility of contagion, then they should have acquired definite immunity. This hypothesis is subject to future confirmation.

A very important fact is that several of these children were just a few days or months old. It is known that the mortality rate is highest in infants under 1 year of age, since at this age complications such as bronchopneumonia, encephalitis and especially convulsive conditions are frequent.

The case histories of 2 protected subjects who were exposed to pertussis are useful in demonstrating the good results obtained from the use of alum-precipitated diphtheria toxoid under the conditions described. These 2 subjects were children of a physician and consequently could be watched closely.

CASE 1.—The child B. E. B., 4½ years old, had contact for one week with 3 of her brothers, who had whooping cough. Of these, 1 had a severe form of the disease and the other 2 average forms. The subject was inoculated when pertussis was diagnosed in her older brother, who already had a spasmodic cough. Consequently, the subject was in intimate contact with her infected brother during the entire catarrhal period—the time of highest contagion in pertussis. She was inoculated with 1.5 cc. of alum-precipitated diphtheria toxoid; the dose was repeated one week later. This child did not cough at all, although she was in close contact with her brothers throughout their illness.

CASE 2.—M. T. was a girl 2 years old. Like the subject in case 1, while her brothers had an apparently simple cough she played with them constantly and shared a bedroom with 2 of them. When her father, a physician, diagnosed pertussis I was called in to treat the children. I made the same diagnosis as the father; it was confirmed by the evolution of the disease with typical characteristics and with a duration of four weeks. The girl had close contact with her brothers for at least one week before pertussis was diagnosed and afterward during the entire period of their illness. This child also received two injections of 1.5 cc. each at an interval of one week. She had no cough at all, although her 4 brothers all had typical pertussis.

As I have already stated, not in all subjects was there complete absence of cough. However, as regards those considered protected, if they did cough it was never for more than six to ten days and always in a manner that only vaguely suggested pertussis. The 61 subjects whom I have observed have demonstrated that the best results are obtained when the injection of diphtheria toxoid is done during the period of incubation. If, on the other hand, the injections are made in the catarrhal period, then the disease can be favorably modified in its evolution and intensity and in the frequency of the coughing spells.

COMMENT

In the experimental study in which I collaborated with Dr. Gerardo Varela,[1] we took three groups of rabbits previously protected in the following manner: the first group, with pertussis vaccine prepared by the Institute of Hygiene of Mexico according to the technic of Dr. Kendrick; the second group, with alum-precipitated diphtheria toxoid; the third group, with a mixture of diphtheria toxoid and pertussis vaccine. This study clearly showed that greatest protection resulted in the last group, i. e., in the rabbits inoculated with both antigens—diphtheria toxoid and pertussis vaccine.

A significant similarity can be seen between the results with the exposed children studied in the present investigation and the results with the third group of rabbits, protected with two antigens. In both the children and the rabbits, two antigens were present—in the former, B. pertussis from the contagion medium and diphtheria toxoid; in the latter, injected pertussis vaccine and diphtheria toxoid.

Attention is directed to the favorable modification by the therapeutic use of toxoid of pertussis already established. The earlier the toxoid is injected the better are the results. That this treatment is more effective for exposed persons than for persons already attacked by the disease is due, in all probability, to the fact that the former have more time to elaborate their defenses.

SUMMARY

In 61 children unquestionably exposed to whooping cough who were inoculated with alum-precipitated diphtheria toxoid, occurrence of the disease was prevented. The method failed in 4 cases. Consequently my statistics show protection in 93.4 per cent of the cases.

PSYCHIC TRAUMA OF OPERATIONS IN CHILDREN

AND A NOTE ON COMBAT NEUROSIS

DAVID M. LEVY, M.D.
NEW YORK

Impressed by the number of cases in which ears, anxieties and other symptoms closely followed an operative procedure, I reviewed my records for some years past in order to determine how frequently such difficulties arose.

The findings are given in table 1. Only such patients as revealed manifest symptoms are included. Certain patients in whom it appeared that after an operation some anxiety remained to flare up into acute symptoms later are considered separately (see Reports of Cases, section B). All operative procedures, regardless of form, are included in table 1. They include

TABLE 1.—*Distribution According to Age of Post-operational Emotional Sequelae*

Age at Time of First Operation	Number of Patients	Number of Patients with Emotional Sequelae	Percentage
0-11 months	2	1	—
12-23 months	12	7	58
24-35 months	24	8	33
36-47 months	19	3	16
48-59 months	17	2	12
60-71 months	18	1	6
72-83 months	8	1	11
84-96 months	7	1	
96-107 months	4	0	
108-119 months	5	1	8
120-131 months	5	0	
132+ months	3	0	
Total	124	25	20

inoculations, treatments of small cuts and the like. However, the vast majority of operations were tonsillectomies. Only first operative procedures are included.[1] The effects of cumulative operations are given in the appended case studies. No major operative procedures were recorded for the group under 12 months of age, and evidently the vaccinations and inoculations given in the first year of life were not followed by observable anxiety reactions for the vast majority of children, or such reactions as occurred were regarded by parents as inconsequential. These early experiences require further study.

AGE DISTRIBUTION OF TRAUMA AFTER OPERATION

It will be noted that the largest percentage of postoperative symptoms occurred in the 1 year old children, those in the group aged 12 to 23 months. The 2 year old children also supplied a fairly large number of untoward reactions. Starting with the 3 year old group, there was a definite drop. Among the children under 3 years of age, besides higher frequency, there was greater intensity of response than in the older children.

The accuracy of the data depends primarily on the memory of the main informant, the mother; it depends also on the patient, especially in regard to the material relating to operations that he portrays during treatment, and on the skill or the special interest of the examiner.

Since the data were collected largely with a retrospective interest, omissions are likely. It is only in the past few years that I have been especially interested in surgical operations as sources of psychic trauma. Previously though questions about illnesses, operations and accidents were part of the routine anamnesis, I did not specifically inquire about the emotional response of the child to each event unless the mother told of something unusual or severe. From the nature of the routine investigation of every case, since the mother came largely because of the emotional difficulties of her child, she was likely to tell about special problems arising during and after an operation; there was opportunity to do so in the two to four hours usually devoted to an interview. However, the present investigation, like many others, shows that reliance on spontaneous utterance for the purpose of accumulating data on a special topic is a risky procedure. In psychiatry, as in any other branch of medi-

Presented before the Section on Psychopathology of Childhood at the Fifty-Fifth Annual Meeting of the American Psychiatric Association, May 15, 1944, Philadelphia.

1. The number and kind of first surgical procedures in these patients were as follows: tonsillectomy or adenoidectomy or both, 88; paracentesis of the ear drum, 5; mastoidectomy, 4; appendectomy, 5; other abdominal operations, 1; circumcision, 3; meatotomy, 3; incision or excision of glands, cysts or moles, 7; treatment of fractures and lacerations, 4; operation for strabismus, 2; insertion of a cannula in a tear duct, 1; injection into buttocks, 1; total, 124.

cine, the job of searching for the fact or idea is as important as being receptive to it when it appears.

Another reason for omissions is that mothers tend to forget the postperitoneal trauma of their children with the lapse of time. If a child has a tonsillectomy, for example, at 2 years of age, his mother will be likely to remember fewer of the sequelae if the history is taken three years after the event than if it is taken two years after, and she will remember still fewer if there is an interval of ten years between the operation and the taking of the history. This principle is evident from table 2.

It is clear that there is a definite trend indicating a progressive drop in the percentage of my records of emotional sequelae with an increasing interval of time. In other words, it may be said that the older the child, the less likely is the mother to recall emotional difficulties relating to an operation in infancy.

Without undertaking the task of tracing all my informants and repeating the investigation, I can determine something about the significance of these omissions on the part of the mothers. Under fixed conditions of investigation, with the age of their children at the time of referral ranging between 2 and 20 years, the mothers recalled emotional difficulties following an operation much more frequently when such operations occurred in the first three years of life.[2]

TABLE 2.—*Effect of an Increasing Interval of Time on Number of Emotional Sequelae Recalled*

Time Interval Between First Operation and Age at Referral	Number of Patients	Number of Patients with Emotional Sequelae	Percentage
0 - 2 yr.	25	11	44
2 - 3 yr. 11 mo.	20	4	20
4 - 5 yr. 11 mo.	25	5	20
6 - 7 yr. 11 mo.	16	2	13
8 - 9 yr. 11 mo.	20	1	5
10+ yr.	18	2	11

2. Since mothers are more attentive to the reactions of their infants than to those of their older children, being more protective of the former and in closer contact with them, the question has been raised whether this fact is responsible for the high percentage of emotional sequelae to operations in the younger groups. If this hypothesis were accepted, one would have to conclude from table 1 that the mother's interest in the child's reactions to operations gradually decreases as the child's age increases, falls rather precipitately when her child reaches 3 years of age and remains relatively low from that time on. This is unlikely, especially in regard to symptoms like night terrors, manifest fears and negativistic responses, which are quite intrusive. However, fears which because of repression are not overt are more likely characteristic of later years. They would escape the mother's observation. Their appearance in dreams or in play activities during treatment are the only means of detecting them. In several instances material relating to operations that was not revealed in the anamnesis emerged in the playroom. The mothers were consulted about it and recalled the children's fears. Evidently the fears had not been repressed to the point of preventing overt expression immediately after the operation.

If reference is again made to table 1 and the subjects arranged in groups with an age range of three years each, the data set forth in table are obtained.

TABLE 3.—*Number of Emotional Sequelae of Operation with Respect to Certain Age Groups*

Age at Time of First Operation	Number of Patients	Number of Patients with Emotional Sequelae	Percentage
0 - 35 months	38	16	50
36 - 71 months	54	6	11
72 - 107 months	19	2	10
108 - 132+ months	13	1	8

This table brings out more sharply the difference between the earliest and the other age groups. Now, since the number of omissions of data on emotional difficulties increases with the number of years before the mother appears at the office, one would expect that emotional data for the first years of life would suffer most. Since the majority of my patients are older than 6 years and the majority of their operations occurred before that age, in general, the younger the child at the time of the operation, the longer the average interval before the history was taken. Since in spite of that fact the frequency of emotional sequelae remained higher in the early group than in the others, it may safely be concluded that as a greater degree of accuracy is achieved in later studies, the difference will prove to be even greater than it seems at present.

Regardless of possible omissions, therefore, the significance of the percentages recorded in table 1 remains valid.

REASONS FOR HIGH INCIDENCE OF TRAUMA IN INFANTS

Why are operations so much more hazardous for 1 and 2 year old children than for older ones? Considered in its most frightening aspect, an operation represents an experience of pain performed by strange persons in a strange place after forcible separation from the familiar home and the protecting mother—the main source of security. A full pattern of emotional response to this situation would lead to fear of all strangers, of all places outside the home and of all possible hurts and to desperate clinging to the mother. This pattern of response actually occurred in a number of my patients.

One and 2 year old children, as compared with older children, have a keener response to pain, are more dependent on their mothers and have less experience in social contacts and visits outside the home and less comprehension of what is to take place. Their world is much more circumscribed. Their security in life is invested to the highest degree in home and mother. For them the operative experience is more acute in every phase.

They are also less well equipped to handle anxiety. Night terrors occur especially in this period of life. They indicate a break-through of fear during sleep. The fearful event is not played out with toys, as in the older group, because the children do not yet possess the words, the concepts and the skill required. Three year old children play out the operation. They repeat parts of it many times. They also transpose the roles so that they play the surgeon operating on a doll. Older children may join with others in this type of play.

It is difficult, moreover, to explain to a 1 or 2 year old child what the operation is all about. This is done freely with the older group. For 1 and 2 year old children, then, the operation is a raw and brutal experience, difficult to comprehend as a health-giving device and difficult to transform and relate to other experiences by the use of thoughts and phantasy. Their means of dispelling anxiety are limited to distracting play, random muscular activity, close contact with the mother and her simple assurance that everything is all right.

TYPES OF EMOTIONAL RESPONSE TO OPERATION

The children who were subjects of this study represent a selected group—children referred to a psychiatrist because of behavior problems. It may be thought, for that reason, that their reactions to the operation do not represent those of normal children and that generalizations applying to normal children cannot be drawn from the present data. These data, however, warrant the conclusion that the reactions of this group would not differ widely from those of a so-called normal sampling. Thirteen of the 25 children who had untoward reactions showed no evidence of any difficulty previous to the operative procedure. The total group of 124 presented, in the main, a variety of mild behavior problems, with 16 instances of definite psychopathology.[3]

3. A classification of the problem in terms of the main reason for referral follows. (The 16 severe problems were instances of mental retardation, severe psychoneurosis, psychopathic personality and psychosis.)

Social difficulty (difficulty with other children because of shyness, bossiness, hitting, etc.)	9
Problems of family relationship (sibling rivalry, mother-daughter antagonism, overdependence on mother, etc.)	9
Negativism (disobedience, disciplinary problems, tantrums)	26
Difficulty at school (problems of school work, including difficulty in reading)	12
Night terrors or fears	18
Insomnia	4
Habit problems (enuresis, 5; soiling, 1; masturbation, 2; hair pulling, 1; head rolling, 1; nail biting, 1)	11
Passivity (including laziness, 3 cases)	3
Compulsions, obsessions	3
Tics	3
Hyperactivity	1
Problems of effeminacy and masculinity	2
"Psychic accidents"	1
No problems	2
Total	124

The postoperative emotional sequelae are listed in table 4.

Night Terrors.—Night terrors are differentiated from fears because of their special features. Of the 7 children who had night terrors, 5 were 18 months of age or younger, and 2 were in the 4 year old group. The 2 children 4 years old had brief intervals of night terrors lasting one week only. Both had had previous difficulties that made them more susceptible emotionally to the operation. One had had 2 previous operations; the other was in a state of marked dependency on the mother, following the birth of a baby brother. The night terrors in the younger group were all of longer duration, extending over months or years. In 1 patient, the infant of 6 months, night terrors preceded the operation for one to two weeks.

TABLE 4.—*Types of Postoperative Emotional Sequelae*

Age at Time of Operative Procedure	Night Terrors	Fears	Dependency	Negativism
6 months	(+)	+	..	..
12 months	+	+	..	..
15 months	..	+	..	..
16 months	+	+	..	..
18 months	+	+	..	..
18 months	+	+	..	..
18 months	..	+	..	..
19 months	..	+	..	..
24 months	..	+	..	..
24 months	..	+	..	..
27 months	..	+	+	..
30 months	..	+	..	..
30 months	..	..	+	..
30 months	..	+	+	..
30 months	..	+	..	..
35 months	..	+	..	..
37 months	..	..	..	+
40 months	..	+	..	..
43 months	+	+	..	..
48 months	+	..	..	..
55 months	..	..	..	..
60 months	..	..	..	+
79 months	..	..	..	+
93 months	..	+	..	+
110 months	..	..	..	+

Negativistic Reactions.—In contrast with the night terrors, which had an early onset, the

negativistic reactions occurred in the older operative ages: 4 of the 5 in children 5 years of age or older and the other in a child aged 3 years 1 month. The negativistic reactions following the operation represented spiteful reactions against a parent or parents and were manifested as disobedience, temper tantrums, defiance and destructive behavior. In 1 child (case 27) stuttering followed a tonsillectomy within a few days. It was clearly the spiteful reaction of a negativistic child against a mother who was a stutterer. It cleared up promptly when the child was told that it was a spiteful mimicry of the mother. In another child (case 89) a definite and total change in personality occurred—the only example in the series of such a transformation.

The negativistic reactions probably represented a revengeful attitude, the result of a life-threatening experience. In all the children having negativistic reactions manifest fear responses were secondary or absent. The real meaning of the reactions remains obscure. In 1 patient, whose case (no. 117) provided ample opportunity to study the problem in detail over a long period, the operation, a circumcision at the age of 6 years 7 months, was preceded by a struggle of the patient with his father and the anesthetist before they overpowered him. Immediately after the anesthesia wore off, he said over and over, "They cut my penis. I wish I were dead." The rest of that day the patient never left his mother's side. Thereafter his previous temper tantrums developed into destructive rages. During the treatment he played numerous killing games, in which his father was the principal victim. The operation represented a castration by his father. It was never followed by night terrors. For several months he had a fear of closed rooms, though never a fear of darkness. His fear was definite claustrophobia. When he was in the bathtub and his mother closed the door of the bathroom, he would jump out of the tub. The closed room represented the surgery in which the castration took place. This fear passed, but the destructive behavior and occasional suicidal impulses continued. The symptoms took chiefly an aggressive form.

After an operation which was similar from a psychologic point of view, a meatotomy (case 61), the response was largely one of fear. A series of operations followed, at which the mother was always present. The operative fears crystallized into a fear of castration by the mother. Strong aggressive reactions developed after the age of 8 or 9 years, but they remained secondary to the manifestations of fear.

Negativistic symptoms appear to be consiste with a period of general resistant behavior the child involved. It has been noted also a number of reactions due to sibling rivalry th when the baby was born during this phase t child reacted chiefly with increased opposition behavior. It would appear that at the earl age, in keeping with the helplessness of the infa the reaction to danger is largely in the fo of anxiety, with little or no evidence of hostili With increasing aggressiveness, the reaction danger may break through largely in the fo of hostility.

Dependency Reactions. — The dependenc consisted of clinging to the mother, refusing be out of earshot of her, insisting on knowi exactly where she will go at night and wh she will come home, wanting the mother help in dressing, etc., when this was unnec sary, and the like. Though all manifestatio of fear, especially fear of the dark, are of nec sity accompanied by increased dependency, o those patients in whom dependency became predominant symptom were included in the tab Of the 3 children in whom it occurred, 1 ma fested no specific fears. Clinging or increas dependency for a few days to a few weeks f lowing an operation is so common that it m be considered a normal reaction in childr Children showing this reaction were not i cluded in table 4.[3a]

Regressive Symptoms.—It is interesting th there was no need of tabulating regressive sym toms among the emotional responses in our seri They hardly ever occurred, except so far increased dependency may be considered regr sive. The only instance of regression was a girl (case 36) who had been free of temp tantrums for three months during treatment a who had a recurrence of them after a tonsill tomy. There was no instance of such regressi symptoms as bedwetting, baby talk and feedi problems arising anew after the operation. The were, however, 3 instances of intensification previous symptoms; for example, bedwetting 1 patient became more frequent after an oper tion than it had been before.

This is unlike the situation in sibling rival in which regressive symptoms appear common The difference lies probably in the diverse effe

3a. Freud, S.: The Problem of Anxiety, New Yo W. W. Norton Company, Inc., 1936. Edelston, Separation Anxiety in Young Children: A Study Hospital Cases, Genet. Psychol. Monogr. **28**:3-95, 19 Jones, H. E., and Jones, N. C.: A Study of Fe Childhood. Educ. **5**:136-143, 1928. Bridges, K. M. Emotional Development in Early Infancy, Child D velopment **3**:324-341, 1932.

an acute experience of short duration on the e hand and a protracted experience with an ute early phase (first awareness of the baby) the other. The immediate sibling rivalry sponse may be similar to the operative re-onses. The regressive symptoms follow in course of time and take the pattern of the by's behavior some time after the original ock of the new discovery.

Fears.—The most frequent objects of fear re darkness (7 instances), physicians and rses (7 instances) and strange men (5 in-nces). The fears are recorded in tbale 5.

TABLE 5.—*Fears*

Age at Time of Operative Procedure	Dark	All Strange Men	Men with White Coats	Strange Buildings and Places	Physicians and Nurses	Hospitals	Streets, Visits, School	Medical Examination or Treatment	Other Fears
6 months	..	..	..	..	..	..	..	..	
12 months	+	..	..	..	..	..	..	..	
15 months	..	..	..	..	+	..	..	+	
16 months	+	..	..	+	+	+	..	+	All bodily injury, disease, hallway, closets, illustrated Bible
18 months	..	..	..	..	..	..	..	..	Bandages
18 months	..	+	..	..	+	..	..	..	
18 months	..	+	..	..	+	..	..	..	Animals, gas pumps
19 months	..	+	..	..	+	..	..	..	
24 months	..	+	..	..	+	..	..	..	
24 months	..	..	..	..	+	+	..	..	
27 months	..	+	..	..	..	..	+	..	Taxis
30 months	+	..	..	..	..	..	..	..	
30 months	..	..	+	..	..	..	..	+	
30 months	+	..	+	+	..	..	+	..	Thunder
30 months	+	..	..	..	..	..	..	..	
35 months	+	..	+	..	..	..	..	..	Haircuts
37 months	..	..	..	..	..	..	..	..	
40 months	+	..	..	..	..	..	..	..	Fears leading to performance of rituals
43 months	..	..	..	..	..	..	..	..	Odd smells
48 months	..	..	..	..	..	..	..	..	Vomiting, choking
55 months	..	..	..	..	..	..	+	..	Noise of waves, of flushing toilet
60 months	..	..	..	..	..	..	..	..	
79 months	..	..	..	..	..	..	..	..	Closed room
96 months	..	..	..	..	..	..	..	..	
110 months	..	..	..	..	..	..	..	..	

FEAR OF THE DARK.—Fear of the dark repre-nts, apparently, fear of things that may hap-n in the dark, besides fear of being separated m the protecting mother. It represents a pendency fear and a direct fear. When de-ndency on the mother becomes severe, separa-n from her through sleep is fought hard. It one of the causes of insomnia in children. e danger of the dark itself is in direct relation th the operative experience, because "they t you to sleep and then bad things happen you." Darkness is of itself productive of r, because one cannot see in the dark. There a feeling of defenselessness, a lack of mastery the situation. In a patient previously de-ribed the locked room represented a more ecific example of this type of fear. The fright-ing stories children hear may have to do with ngerous things that take place in the dark, sides stories of terrifying animals. It is in-resting that in spite of this fact, fears in rela-tion to the operation were of darkness in only 7 instances and of animals but once.[4]

FEAR OF STRANGE PERSONS.—Since the total fear reaction would be to strange persons, strange places and hurtful objects, it is interesting to follow the deviations from this pattern. The route from the general fear to the specific runs as follows: fear of all strange persons, of all persons in white coats, of physicians, dentists or nurses and finally of a particular physician. The course does not run according to theoretic expectations. A child may have fear of any one of the four groups and, starting from one, may

4. In regard to fear of the dark as a problem in "loss of mastery" reference should be made to children regarded by the mother as "always cautious." A number of them prove to be children who should be cautious, since their neuromuscular coordination, for whatever reason, is subnormal. To the child with a problem of this sort climbing a tree or jumping off a bench represents a difficulty immeasurably greater than for a normal child. The situation is like that of a child in his early walking stage. He is usually more cautious than at a later period, when he is able to run and jump. The same reasoning applies to an infant whose caution in regard to muscular activities is found to be related to a marked visual defect.

Cautious attitudes in infants are related, certainly, to maternal attitudes. Infantile anxiety from these sources has been more thoroughly explored and is more familiar to workers with children than anxiety arising from "lack of mastery" because of developmental age and problems in coordination. A frightening experience of any kind presumably has an effect inversely proportional to the child's mastery of the situation. This is a cumbersome way of saying that the more helpless the child, the more easily frightened he is. It is worth bearing in mind that a cautious attitude on the part of a child, even without evidence of specific fear, makes him more susceptible to the emotional hazards of an operation.

go to another up or down the scale. For example, a child who had a fear of a particular physician after an operation at 18 months (case 60) began to have a fear of all strange persons after an operation at 2 years 6 months. Between the first and second events there were a number of conditions that intensified the fear reaction so that, starting as a specific fear, it became generalized. Likewise a child aged 2 years 3 months started with a fear of all persons in white coats (physicians, dentists, barbers) and later came to have a fear of all strange persons (case 113).

The immediate fear reaction to all strange persons occurred only among the 2 year old or younger children (cases 22, 47, 98, 110). In 1 instance the fear of all strange persons started at 2 years 3 months and changed after some months to fear only of physicians and nurses. The commonest fear in this category was of physicians and/or nurses only (4 instances, cases 8, 61, 83, 106).[4a]

Other Fears.—The same considerations apply to fear of strange places. Going from the general to the specific, there are: fear of the whole world outside the home, fear of all the outside except school, fear of streets, fear of strange buildings, fear of hospitals and fear of a special hospital. The fear of the outside world and the fear of all strange persons, with their modifications, occurred at about the same time and fell into the same kind of pattern.[5] The most specific fear in this group was a fear of taxicabs in a patient aged 3 years 8 months following the ride to the hospital in a taxi. However, there were certain emotional conditions having to do with taxicabs that made him especially susceptible to the development of that kind of fear. The other fears in this group were fears in children aged 2 years or younger, excepting 1 instance of fear of crossing the street in a child aged 4 years 7 months.

When fears were prolonged in time, the general fears left and a specific fear relating to operative procedure itself might remain, such as a fear of inoculation or of opening the mouth for an examination (cases 22, 60, 75, 83 and 106).

General Characteristics of Fear Patterns.—Of all fears, fear of the dark remains longest. Other fears subsided as the memory of the operation dimmed out, often in a few months. Fear of the dark is fed by anxiety from any source.

A study of the fear patterns shows also that when one operation followed another, the second intensified previous fears when they were still manifest. This cannot be a universal rule, however, as is shown by a child (case 65) on whom previous fears the second operation had no effect. When the fears arising from the earlier operation subsided, the next operation had no emotional sequelae. The particular type of change in previous fears that makes them likely to flare must still be worked out. It would seem that they are especially liable to intensification when they are still related to specific features of the previous experience which are repeated in the new experience. Without accurate knowledge, nevertheless, it is a good rule to postpone an operation, when it can be postponed to a period when previous fears from any cause have been quiescent for several months.

GENERAL CLASSIFICATION OF EMOTIONAL SEQUELAE

Immediate emotional responses to the operative procedures have been described, without being related, however, to a general psychiatric nosology. For that reason another classification is offered. It includes fears, anxieties, phobias, hostilities, obsessions and hysteria. The single example of complete change in personality is not included. It is difficult to classify. It probably is a special psychopathic form of hostile reaction of such severity that a permanent change of attitude results. It is analogous also to a paranoid state. Schizophrenic, manic and depressive reactions were not found in my series. The general classification follows:

1. The conditioned type of fear, either specific to a phase of the operative experience or generalized, and corresponding to the experiment

4a. Jersild, A. T., and Holmes, F. B.: A Study of Children's Fears, J. Exper. Educ. **2**:109-110, 1933. The parents of 54 presumably normal children with ages ranging from 6 months to 4 years cooperated for twenty-one days. Other methods of securing data were used, including experimental studies. Of special interest in relation to the present investigation are the frequencies of the different varieties of fear and the age differences. It was found that the most frequent fears were of the unfamiliar—strange persons, objects and situations; of these the most frequent fear was of strange persons. The 3 and 4 year old children displayed fewer fears than the younger children. In the experimental study the percentage of children displaying fear at the sudden appearance of a strange person was 36 per cent for those aged 35 months or younger, 17 per cent for the 3 year old children and 0 per cent for the 4 and 5 year old children (Bühler, C.; Hetzer, H., and Mabel, F.: Die Affektwirksamkeit von Fremdheitseindrücken im ersten Lebensjahr, Ztschr. f. Psychol. u. Physiol. d. Sinnesorg. [Abt. 1] **1007**:30-59, 1928).

5. The irrational generalization at the age of 12 to 24 months of the fear of an operation to a fear of all strange men and places is consistent with the level of intellectual activity at this age, since any woman may be called "mama" and any man "man" or "daddy" or by the name of some man other than the father.

ears described by Watson. This type is characteristic of the youngest age group.

2. Dependency fears, in general of a regressive type involving closer relationship to the mother and fear of separation from her. They usually include fear of the dark.

3. Latent fear, seen in the form of general uneasiness and anxiety following an operation, that may break through into manifest fears after a later frightening event. The 1 example cited in the appended case reports (case 103, not included in table 5) occurred in a boy who had his first operation when he was 4 years of age. Previously unafraid, he was "scared" in anticipation of the operation, went to the hospital with his mother, was put to bed, was given a sedative and then fell asleep. When he woke up, the operation was over. Until he saw the nurses afterward, he did not know he had been operated on. There was nothing tangible on which to fasten his fear. It remained, presumably latent, until he saw a frightening moving picture that set off fears related to a masturbation threat. Thereafter there was an acute onset of fears of the dark, of crowds and of sickness.

4. Phobic reactions. Compared with the fears, which appear rather plastic, i. e., somewhat responsive to various influences, the phobic reactions appear more automatic and uncontrollable. Thus the patient who had a fear of closed rooms after an operation almost reflexly jumped out of the tub when his mother closed the door of his bathroom. In several instances the fear of opening the mouth for an examination remained for years after all the other fears had subsided and had the fixed quality of a phobia.

5. Anxiety states. The best examples of anxiety states were revealed in cases 61 and 117. In contrast with the reactions of fear that occurred only in relation to events directly associated with the original trauma, they retained a more or less constant state of emotional tension that broke out at times in acute states of panic with, also, suicidal impulses.

6. Hostile reactions, including outbursts of temper and generally negativistic behavior.

7. Obsessional reactions. One instance occurred in this series (case 39). It followed a tonsillectomy at the age of 3 years 4 months. The patient made a scene whenever his ritual of arranging his clothes at night was disturbed in any detail. His slippers had to be placed together under the bed over a definite spot, his robe had to be folded just so and placed over the foot of the bed at just the right angle, etc. In his relation to a younger sister preceding the operation his jealousy took especially the form of a possessive reaction. He never allowed her to touch any of his things. He became unusually attached to his possessions. The anxiety following the operation took the form of strong self protection, possessions being used as symbols to preserve self integration. There were no manifest fears related to the operation.

8. Hysterical reactions. There is 1 instance in the present series (case 48) of hysterical numbness. It occurred in a boy aged 11 years at the time of the operation, the oldest patient at the time of operation in the series. The attacks of numbness were accompanied by other fears. The patient had always been "fearful." The details are recorded in the appended case records and need not be repeated. The feeling of numbness was found to be directly related to the feeling he had when going under the anesthetic.

Fear of vomiting and of choking following a tonsillectomy in a child 4 years of age (case 42) may also be included among the hysterical reactions, since it was accompanied by definite sensations in the throat. The patient had had vomiting spells on a few occasions in his second year of life and vomited immediately after the operation and the next morning.

In contrast with the other patients, both patients who had hysterical reactions experienced in response to the operation a definite organic sensation which was associated with fear.

PROPHYLAXIS

The high degree of emotional distress resulting from an operation in the first two years of life makes it advisable to postpone it, if possible, to the age of 3 years or later, when the child's comprehension and ability to master anxiety are developed to a higher degree. It becomes especially important to postpone the operation if the patient is going through night terrors at the time or manifests fears or more than the usual dependency on the mother.

A review of case studies in which no untoward emotional symptoms followed an operation reveals clearly the procedure that should guide the surgeon in preventing psychologic distress to his patient. The case studies confirm the observations already made. The children who remained free of emotional difficulties after operation had been told the reason for the operation and how it would be performed. They were taken to the hospital by the mother or father and anesthetized or given sedatives in the bedroom. After the operation the mother or the father or a governess was there to greet them, usually with

a present. Under the conditions described the children were spared the following experiences recorded in the text and in the appended records: being tricked into the hospital; being wheeled down a corridor; struggling against the anesthetic; suddenly seeing weird instruments; seeing the white surgical room; seeing many people in white, some in the distance and some hovering over them, and returning to a new bedroom with a strange nurse, another person in white.

I do not mean to imply that children have not survived operations well in a psychologic sense in spite of the experiences enumerated. In fact, some of them accepted and enjoyed every phase of them. A number even in the 4 year old group spoke enthusiastically in detail about "my operation." Nevertheless, the data collected reveal all too clearly the emotional hazards.

The prophylactic procedures require some elaboration:

1. A detailed and accurate explanation of the operation is not important. It is important that the child feel it is a necessary thing to do and that the operation be "explained." The feeling that a thing is explained, even if the explanation is inaccurate, relieves tension. The explanation should be simple and brief and should be repeated as many times as necessary.

2. Going to the hospital with a familiar person, preferably with the person the child is closest to, is obviously necessary to reduce the feeling of apprehension.

3. It is best in the case of a young child to have the mother help him to bed. Administration of a sedative preceding use of a general anesthetic is advantageous.

4. Whenever possible the child should be spared the experience of seeing instruments, seeing the operating room, riding up and down in the elevator, etc. After falling asleep in his bedroom, he should, if possible, wake up in the same room.

5. When he wakes, the mother should be there to greet him. This point is especially important. A child in a strange place, often for the first time in his life, and in acute distress should at least have the security of his own protecting mother.

In principle, the operative experience should be divested, as far as possible, of the strange, the frightening and the unfamiliar. No doubt, in time, the surgeon will consider the psychic response of his patient before, during and after the operation as intimate a part of his problem as the surgical technic itself.

CHILDREN'S OWN PLAY OF THE OPERATION

Shortly after her second year, after otitis med and pneumonia, 1 patient, a girl of superior i telligence (case 22), played out her experien of illness with dolls. She put them to bed a played taking them to the hospital, nursing the and giving them medicine. After a tonsillecto six months later this play continued. But s never played that her dolls had a transfusi (an experience during her attack of pneumon from which she came to have fear of gasoli pumps), an anesthetic or any operation. Wh she was 3½ years old, shortly after the trea ment began, she added the play of the operati in every detail to her own play. Hence it m be concluded that in attempting to get rid anxiety through play of her own devising, s was unable to include those elements that we the most fearful.

Another child of superior intelligence, a b aged 2 years 3 months at the time of operati (case 47), for years played "cone on the nos with his dolls. There was constant repetition this play. He played the same game also wi his younger sister. "Cone on the nose" w played by placing a cone-shaped object over do and holding it there and then removing it a repeating the process. This boy, instead playing a kind of generalized medical care lea ing out the anxiety event as in the former cas played out the experience of anesthesia but nev dared continue to the operative experience itsel Unlike the first patient, he kept close to t danger zone.

A third type of postoperative play was see in a boy aged 4 years at the time (case 61) whose play was in the form of destroying thing cutting people up and burning them, saying, " will cut my face off, I will cut my hands off, will cut my wee-wee off," repeating the sam thing about himself and about the nursery scho teacher. His type of play had to do with fear of castration immediately following a me totomy.[6] It dealt directly with the focus anxiety.

In the case of a girl on whom tonsillecto was performed when she was 4 years 7 mont

6. This patient and 1 other (case 117) manifest suicidal impulses. In both there was evidence of seve anxiety preceding the operation. In both, also, t operation was on the penis. In the case of the seco patient the operation was preceded by a severe physic struggle. It is interesting that in these 2 patients t severest anxiety reactions of the entire group occurre This poses the question of suicidal impulses as a r sponse to extreme anxiety in similar cases, anxie that at the moment goes beyond "absorptive capacity."

d there was no evidence of any kind of play conversation about the operation, though finite fears were present (case 17). The other had exclusive care of the child and was rtain that she knew every play her daughter d performed. Since the problem of negavistic behavior, for which she had been referred, d its onset at 16 months of age, it is possible at the absence of play or conversation about e operation constituted a type of oppositional tivity. During treatment several repetitions the play of the operation, in which she coerated fully, revealed no evidence of anxiety the age of 5 years 2 months.

At the present time it is impossible to state hy some children play out the operation and hers do not. The problem is related to a ild's general ease of communication in social lationships and to his freedom of phantasy ith play material.

Wish fulfilment or regressive play, as in the se of children who after the birth of a sibling act with their dolls the role of an infant, was ot recorded in our postoperative group. The oll play was concerned, presumably, with direct lease of anxiety.

In regard to emotional trauma from whatever use, the following types of phantasy play in ildren may be distinguished:

1. Nonspecific release. This type of activity throwing things, tearing paper, spilling water, uilding towers of blocks for the fun of knockng them down, messy play, etc., often accomanied by some dramatization—is an early stage f phantasy play, a stage above the release of ension through simple muscular activity.

2. Impersonal play. In this type of play the arly imaginative embroidering of simple activiies gives place to play with definite form. Such lay requires more skill in manipulation of obects, more ability to inhibit distraction and more erbalization. Typical of this stage is the play f battle, in which soldiers are put in various ormations and tactics. Opposing forces are ommanded by generals, and the like. There is very variety and complexity of the impersonal lay. From a psychiatric viewpoint the play ffords an easy release of feeling, since it is not nxiety inciting. For the child, it is impersonal, he characters are not identifiable, feelings are rojected, aggression is guiltless and the satisaction of power and conquest is high.

3. Personalized play. This includes all varieies of play that depict actual personal experience. n the regressive form, as previously mentioned, he play represents the solution of emotional diffiulties. Personal plays may be in the third or in the first person. As in the play of postoperative fears, they may generalize the experience, deal with specific aspects of it, play off in repetitive form the anxiety elements, reversing the roles of patient and physician, or distort and manipulate the experience in the same manner as is done in dream formations and with the same goal—the solution of a difficulty.

A PARALLEL WITH COMBAT NEUROSIS

All the symptoms of the child are similar to symptoms of the adult suffering from combat neurosis—night terrors, fear of the dark, anxiety symptoms, obsessions, hysteria and even symptoms of negativism.

The situation is also somewhat similar—a dangerous place far away with strange persons. In general, it may be said of the child as of the adult that the more dependent he is on the immediate family, the less the range of mobility in his life experience, the more productive of anxiety is the dangerous, strange, far off place. On the other hand, the greater his comprehension of what is to take place, the greater his knowledge and hence his mastery of the activity to be expected, the greater his feeling of security with human beings, the less likely is it that anxiety symptoms will follow.

As for a soldier, so for a child the protective requirements are comprehension of the objective, mastery of the technic to be employed, good relationship with the persons who are to share the experience with him and confidence in a leader and protector.

There are, however, important differences between the postoperative traumas of infants and the combat neuroses of adults: Whereas the child's leader and protector, the mother, need give only reassurance and proof of love, the soldier's protector, his officer, must give also proof of technical knowledge. Unlike the child, the soldier requires proof, tested by actual experience, that the leader knows full well what he is doing. Without that confidence in his knowledge, the other emotional values the leader can give are reduced. Another difference is that the officer must possess qualities of leadership which the mother need not have. Besides military knowledge and a protective attitude, the officer must give proof also of leadership, in the sense of fulfilling an authoritative role. The mother operates much more exclusively in the protective sphere than the officer and on a purely emotional level.

SUMMARY AND CONCLUSIONS

A review of the records of 124 children referred for behavior problems who had under-

gone an operative procedure (tonsillectomy in most instances) revealed that in 25 there were manifest emotional sequelae. The largest percentage of sequelae occurred in the group under the age of 3 years (50 per cent); the proportion in those above 3 years averaged about 10 per cent. A study of the percentages obtained in proportion to the number of years that elapsed between the child's operative procedure and the date on which the history was derived from the mother revealed that these percentages were reduced as the interval of time increased. Hence the derived percentages were considered to be lower than the actual percentages, and the actual number of emotional sequelae larger than the number recorded.

In 13 of the 25 children who suffered psychologically from the operation there were no histories of emotional difficulties preceding that event. The increased emotional hazard of the operation for the 1 and 2 year old children was related to their keener response to pain, poorer comprehension of the experience, greater dependence on the mother, less experience in social contacts outside the home and less facility in handling anxiety.

Prolonged night terrors were characteristic responses of the 1 and 2 year old children; negativistic responses, of those aged 4 years and older. Fears other than night terrors occurred at every age level up to 8 years. Dependency reactions, though necessarily arising whenever fears are present, were especially noteworthy in 3 children. Regressive reactions, such as a return to enuresis, feeding problems and the like, were rarely present.

Manifestations of simple anxiety, consistent with dependency and helplessness, occurred in the youngest age group; manifestations of hostility, consistent with increased aggressiveness, occurred in the oldest age group.

The most frequent fears were of the dark, of physicians and nurses and of strange men. The "total fear reaction" was to strange people, strange places and hurtful objects. There were various modifications of total specific fears. When prolonged, the general fears left, and a specific fear relating to the operative procedure remained. Otherwise, fears of the dark outlasted all others.

When considered in accordance with general psychiatric nosology the emotional sequelae were classified as follows:

1. Conditionad fear.
2. Dependency fears and regressions.
3. Latent fear.
4. Phobias.
5. Anxiety states.
6. Hostile reactions.
7. Obsessions.
8. Hysteria.

The prevention of postoperative fears is thoug to consist of the following steps:

1. Postponement of the operation, if possib to at least the age of 3 years, especially if e dence of anxiety or undue dependency on t mother is evident.

2. An explanation to the child of what is take place, to overcome reactions to the stran or surprising event.

3. Contact with the mother before and aft the operation.

4. Preparatory sedative and anesthetic in t bedroom, to spare the child the experiences seeing instruments and the operating room a riding through corridors.

The child has his own method of overcomi anxiety through play of his own devising. the 2 instances in which suicidal attempts or ne attempts were made, the anxiety was unusual severe and was regarded as beyond the child "absorptive capacity."

The child's postoperative emotional sequel are analogous to combat neurosis, since t symptoms are of the same type and the princip of prevention the same.

REPORT OF CASES

A. *Case Studies Included in Table 1*[7]

CASE 8.—*Fear of physicians and hospitals followi a tonsillectomy.*

A boy aged 6 years was referred for night terro which had begun before a tonsillectomy was perform because of sore throat, when he was 3 years o The trauma had lasted several weeks.

For some months after the operation he manifest acute fear of doctors and of hospitals. Unfortunate the operation was performed during a period of nig terrors.

CASE 17.—*Fears in a previously timid though n fearful child following her first operation, at 4 year and recovery from the fears within three months. Fe of crossing the street and of loud noise. No nig terrors.*

A girl aged 5 years 1 month was referred for neg tivism and temper tantrums, first observed at 16 month A tonsillectomy was performed at 4 years 7 mont because of chronic fever (101 F. every night) and cold The nightly fever did not recur after the operation.

The patient was told by her mother what wou happen. She went to the hospital willingly. She r mained there five days after the operation because acidosis. Before the operation she showed no fear though she was "a bit timid."

In the hospital after the operation she screamed great deal. Within a few days after she left the ho pital she showed fear of crossing the street. She wou say, "Are you sure the light's red, mummy?" She w

7. When not otherwise stated, the history of birt infancy and development was uneventful.

prehensive of the moving automobiles. Previously had been somewhat timid on crossing the street. so, a week after leaving the hospital she showed r of the noise of a flushing toilet at a summer resort. One month after the operation she was given swimng lessons at her own wish. She was terrified of waves and the noise and kept to shallow water. There was no evidence of doll play about the operan. She never talked about it. All fears were gone three months. She had no night terrors. During atment, in a play of the operation at 5 years 2 nths, she showed no evidence of anxiety.

CASE 22.—*Fears starting with an accident, stimulated successive operations after diminution and involving sturbation fears.*

A girl aged 3 years 5 months was referred because was "full of fears" and had night terrors. At months of age she lacerated her scalp when she identally ran her head through a windowpane while ching for a doll. She was taken immediately by her ther to a nearby hospital. The child's head was held htly while the hair was shaved, iodine applied and lacerated skin quickly sewed up. She had six tches without an anesthetic.

Before the accident the child had been fearless and h spirited. Thereafter she became tense and timid d had fears of frogs, snakes and other animals. bladder control had been established by 18 months. ere was no return of enuresis. The developmental tory was rather advanced. She had good coordinan and vocabulary by 18 months.)

At 23 months she began to have night terrors about ce a week. She would wake crying or whimpering. e related two of the terror dreams in which there s "lightning in her face" (possibly the crash of her d through the windowpane), two about "a big black g" and one about "a part of me cut off."

At 24 months, because of otitis media, her ear drum s incised three times. After the otitis, pneumonia veloped, and she was in a hospital for three weeks. at was her first experience away from home. At the spital she seemed "afraid of everything"—the apach of any person, instruments, etc. When a roentnogram of the chest was taken, she fought and had be strapped down. After the experience at the spital a fear of gasoline pumps was added to her er fears. The mother related it to a transfusion blood she had at the time. In this period her orite play with dolls was that they were sick and d to be put to bed, taken to the hospital, etc.

Because of tonsillitis and breathing through the uth, a tonsillectomy was performed when the patient s 30 months old. Following it there was an increase frequency of night terrors for about six weeks, from ce a week to once every night or two, and intensifition of all her previous fears. Masturbation, conting of pressure of the fingers against the labia, was t observed a few days after the tonsillectomy.

In the play sessions she manifested anxiety when rts of an amputation doll were removed, when she nd a tear in a doll or any broken object, when she a tongue depressor and when she went into a dark ner. When she played the operation with a knife, cut out the tonsils and the "tootsie" (vagina). e put paper over the doll's eyes so it couldn't see. ter the second session her play at home was inenced by the therapy. In her play of sick dolls she signated for the first time their sick throats and ke about her own sick throat. On the first night er this play she woke up in the dark and complained t she couldn't see.

The tonsillectomy meant to her, among other things, ndonment and punishment for masturbation, since in play all the bad parts were to be cut out and own away. The child said in playing the operation, "They will frow her away, they will paint her, they will stick a knife in her mouth, they will stick a knife in her tootsie." Throwing away things continued at home in her play also. In her play activities phases of each operative procedure were revealed—being painted, hair being cut, incisions, anesthetization, sudden noise, blood, sticks in the mouth and physicians.

CASE 23.—*Fear of haircuts and of the dark and increased frequency of bedwetting following an operation at 2 years 11 months. Recession of the bedwetting and the fear of haircuts; continuance of the fear of the dark, though increased, until a second operation, when only this fear increased.*

A boy aged 5 years 9 months was referred for disobedience and for incorrigibility at school. He had always been sensitive to noise, though there was no history of "startling" to noise in infancy. He was disturbed by all jangling noise. At 2 years 11 months a meatotomy had been performed with gas anesthetic at a physician's office. He was taken there by his parents. The father was with him in the office, while the mother was in the waiting room. The whole operation, from the time he entered the room until the time he left, lasted ten minutes. When he saw his mother after the operation, he said, "That's a bad doctor. I don't like him," and then, "Is my penis all right?" He was brought back twice for dressings and cried but did not struggle. The mother picked him up and comforted him. At the first postoperative examination the surgeon stretched the glans penis to note the opening of the urethra. No sutures were taken. The mother applied lotion for ten days.

Previously the child had wet the bed occasionally; after the operation he did so nightly. Also he refused for two months to have his hair cut. For a period, too, he wanted a light in his room. The mother allowed it for six weeks and afterward compromised by permitting a flashlight, which at the time of writing he still has, though it doesn't work. A light in the hall is still allowed. Six months after the first operation there was an accidental laceration of the skin of the forehead, which required two stitches. He accepted the treatment well. Fear of the dark increased for a while thereafter.

CASE 27.—*Stuttering as a spiteful reaction to a stuttering mother, following a tonsillectomy at 3 years of age, during a period of negativism.*

A girl aged 4 years 0 months was referred for stuttering and negativism, first observed at 3 years 1 month. Her infancy had been uneventful. However, at the age of 2 years she had displayed marked negativism and temper tantrums.

A tonsillectomy was performed at 3 years 1 month. Stuttering followed. It was found to be a spiteful reaction to a stuttering mother and was quickly cured.

CASE 31.—*Increased attachment to a nurse who was with the patient at the time of her operation, at the age of 2 years 6 months.*

A girl aged 7 years 2 months was referred for a problem in speech and for crying spells, which had been present since infancy.

Her tonsils and adenoids were removed at the age of 2 years. Her reaction was negative except for increased dependency on the nurse who accompanied her, which continued for several months.

CASE 36.—*Recurrence of temper tantrums and disobedience, after a three month cessation during treatment, following a tonsillectomy at 9 years 2 months.*

A girl aged 7 years 10 months was referred for temper tantrums and disobedience. She showed marked improvement and finally presented no problem for three months during treatment until a tonsillectomy at the age of 9 years 2 months. Negativistic behavior returned, though it was milder than previously, and

was cured in three months. In the hospital she was fully cooperative. Her behavior was found to be a spiteful reaction against the mother, who was blamed for it all.

CASE 39.—*Obsessional rituals following an operation at the age of 3 years 4 months.*

A boy aged 3 years 8 months was referred for a problem in speech and sibling rivalry, chiefly in terms of possessions. A tonsillectomy was performed at the age of 3 years 4 months because of attacks of tonsillitis. A week after the operation he started "rituals." His slippers had to be placed together directly under the bed over a certain spot, his robe had to be over the bedpost at the proper angle, etc. Any disturbance of these details evoked strong protest. Fear of the dark started at 3 years 8 months, after his discovery that his nurse was absent one evening.

CASE 42.—*Fear of vomiting and of choking following a few vomiting spells after a tonsillectomy at 4 years, in a patient who had displayed fears since 10 months of age.*

A boy aged 4 years 3 months was referred for fears, which had begun at 10 months of age, and for vomiting spells. A tonsillectomy was performed at 4 years, with ether. There was no struggle. He vomited immediately after the operation and again the next morning. Thereafter he had constant fear of vomiting and later fear of choking. (He had had some vomiting spells on a few occasions in his second year of life.)

CASE 47.—*Fear of strange persons and increased dependency following an operation at 2 years; fear of physicians and of taxis following an operation at 3 years.*

A boy aged 8 years 10 months was referred for psychic vomiting and fears. At the age of 2 years he had been frightened by a foghorn on a boat. He stuttered at intervals for two to three weeks thereafter. At the age of 2 years 3 months he screamed at an examination of his throat. His tonsils and adenoids were removed at that age because of frequent colds.

No particular reaction was noted after the effect of the anesthetic wore off. When he returned home he became dependent and clung to the mother. (Until the time of operation he had been "independent" of the mother.) He was fearful of being left with an unfamiliar person. He was never content out of the mother's sight and did not want to return to nursery school. This continued until he was about 5 years of age.

Because of a tight foreskin, his penis had since his birth been occasionally retracted. Circumcision was necessary, and at the age of 3 years 8 months this operation was performed with general anesthesia. After leaving the hospital he was afraid to enter a taxicab. Previously, taxicabs had evoked no fear. In fact, he had an unusual interest in taxicabs and other automobiles and traveled to nursery school frequently in taxicabs. Also, fear of physicians was noted at this time.

Control of the bladder had been established by the age of 24 months. There was no return to wetting.

He played out the tonsillectomy in games a great deal, chiefly enacting "cone on the nose." The game was repeated many times and was played for years. During treatment the patient made many plays relating to the operation and hospitals. He revealed no memory of fear of castration. However, at the age of 9 he reported a dream in which his shoe was stuck to his foot and they were just starting to put him under ether when he woke up.

(This boy's sister had her tonsils removed at the age of 3 years. Her physician was more understanding than her brother's, and she had no bad reactions. A friend of the mother, well known to the child, had her tonsils removed at the same time and slept in the room with her at the hospital. The sister had none of the fe her brother had. She participated, however, in medical game he played.)

CASE 48.—*Attacks of numbness following an a noidectomy at 9 years of age.*

A boy aged 11 years 2 months was the older o children, the second a girl aged 9 years 1 month. was referred by his pediatrician because of "po operative hysteria." After returning from the hosp (at the age of 11 years 0 months) two weeks after adenoidectomy, which was surgically uneventful, he h attacks of "numbness" all over his body. The pati dated the onset of numbness from the day of operation and related it to a "frightened feeling" anticipation of it.

The first "attack" of numbness occurred in a sch bus. He screamed and told the driver to let him so he could get some air. The driver led him to front seat and opened the window. The patient thou the attack lasted a few minutes. That night he ha few attacks of "numbness" in bed. Some weeks l a school friend asked him to smell "a lot of junk" concoction of glue, hair tonic and other things). smelled it, had the feeling of numbness and scream again. That lasted a few seconds, he said, and af ward he felt shaky. He had another attack a few we later. Altogether he had had about twelve such atta before referral. They were not followed by night t rors, fainting or any specific fears. However, he h been fearful since early life, though the relations of these fears to his first operation (a tonsillectomy 4 years of age, and his only other operation) was known. Though denying fear of the dark or stay at home alone, the patient had "always" quizzed parents at night to know exactly where they w going, when they would be home and the like. Ne too well coordinated, he began to have a fear of foot and of physical combat.

Physical examination revealed no abnormalit There was no history of infantile convulsions. He a number of friends and was excellent in his studies school.

It was difficult to determine the onset of his fear whether they preceded or followed the first operati at 4 years of age. It was known that he was activ masturbating at the time and was told by his mot that it would make him nervous. It was clear that specific feeling of numbness was related to his react to ether. Actually, when the operation was played and he smelled a bottle of water which represented ether, a minor attack of anxiety and numbness was produced. Whether the anxiety originated in the f operation was reactivated by the second or was initia by the second operation could not be determined.

The factors related to the attacks of numbness a anxiety following the second operation appear to be follows:

1. Apprehensive anticipation based on earlier anxiet

2. The experience of seeing his sister, who operated on at the same time, getting "a shot in arm" and an "enema" and being wheeled out—all a hour in advance of his operation. This experie heightened his fears.

3. The repetition of the experience of going un ether.

4. A variety of fears relating to masturbation a sexual impulses toward his sister and his mother.

5. An experience in which some boys bullied h shortly after the operation.

Thus, the second operation became an unusually fe ful experience because the danger itself was heighte by previous intensifying factors, fear of the aggress of his schoolmates and sexual complexes.

is memories of the tonsillectomy included the following details: He remembered vaguely going under ether and crying. "I remember the adenoids. It in October. My sister had it first. They gave her not in the arm and an enema which was an anesic. I saw it all. We were both in beds in the pital. I felt scared. It was a little weird to me. aw the effect. She lay down and she was taken y. I was surprised to find her asleep. I didn't w the enema was an anesthetic. She was put on ay—well, a couch. My mother read to me; one of favorites, 'One Winter,' by Martin Gale. Then they e for me, and I was on the tray, and they were t to wheel me out when they gave me a shot in he arm, which I took bravely. Just like any other in the arm. No effect. Then they said I was a d boy. I was wheeled up to an elevator, through her floor and into a small room, an operating room. y there for a while, alone. I felt nervous. Then a e came in. I asked the nurse if her name was on back of her medal, which was on her chest. She , 'Yes, look.' She showed it to me, and it was L. L. I couldn't read it because it was script. Then I ember the doctor, Dr. R., a friend of mine. He e in and said hello to me. Then Dr. B., the same who gave my sister the anesthetic, came in with her nurse, and he and the nurse put a cone on my . Then I kind of felt like going under. I remember smell of the ether. In fact, I remembered it this ning. I thought it was weird. I remember the e gave me her hand to hold. An then I remember ing to a point. I was kicking before that. It was e point way in the distance. Then I decided I'd up consciousness and come to that point."

ext he remembered the sun shining through the dow, and then he thought for a while that he was is own room. Then he remembered some tennis rts, where the doctors played. He crawled down bed to the window to see what was doing, and the e pushed him back. His mother was sitting there He went back to bed.

Oh, now I remember something the day before the ration," he interrupted himself. After playing tennis n a group, he was coming home with his mother. is sister said, "You'd better eat a good supper tonight, because we shan't have breakfast tomorrow." Why?" he asked.

he said, "We're having the operation at 7 o'clock."

hen he remembered asking his father an hour before t the operation was.

is father said, "Bah! A minor operation."

e asked his father whether he had had an operation. father said, "You'll feel groggy."

is recollections now returned to the hospital room. remembered having a sore throat. He felt with his gue that his adenoids weren't there. He then fell ep. Before falling asleep, he asked his mother for a k she had promised him as a present, an Oz book. en asked to describe the feeling of numbness he lied, "That's the feeling when you go under the er."

ASE 60.—*Fear of the physician who gave the patient injection when she was 18 months old. After being mined by the same physician at 2 years 6 months, r of all strange men.*

girl aged 2 years 6 months was referred for fears. er referral problems were jealousy of the baby, a aged 7 months, hitting other children and dependcy on the mother. At 18 months of age she was ill h erysipelas. She was in bed two weeks and reered completely. During the illness she received one ection of serum in the buttocks. She screamed. Since n, she screamed at the sight of the physician, who d in the same building as her family and whom she sometimes met on the street. This situation gradually improved. At the age of 2 years 4 months she was seen for fallen arches by an orthopedist, and there was no difficulty. Two weeks before her referral she returned to the first physician for a routine physical examination. Again she screamed and thereafter until a few nights before referral awoke crying, "No doctor, no doctor." Whenever she saw a strange man, her lips quivered, and she said, "No doctor, no doctor."

She had had no serious illness other than erysipelas. Her prenatal history, her birth and her developmental history were normal.

When the examiner came to the waiting room, she clung to her mother and cried many times, "No doctor, no doctor." In the playroom she displayed anxiety when the examiner sat on a table, picked up a tongue depressor and turned on the water, and when she came near the scale. Nevertheless, it was possible to get her interested in play. At the third session she came willingly into the playroom without her mother and seemed happy at play. Up to the sixth session her play consisted of a gay and boisterous release of biting and other destructive behavior—smearing, sucking and splashing of water. During that session I introduced a play using the words "doctor" and "doctor's stick." She took the doll that was called the doctor and threw it into the wastebasket. She showed some anxiety, to judge her facial expression, which indicated readiness to cry, and a momentary pause of all body movements. But she displayed nothing more. Her automatic words, "No doctor, no doctor," which she continued to repeat on the way to the office, had diminished greatly in frequency, only to recur by the eighth interview. At the eleventh session, for the first time, she omitted the "no doctor" when she stepped out of the elevator. On returning to her governess after the play session, she met a strange man in the waiting room. She said, "No doctor." The man approached and said, "Good morning." She replied, "Good morning," and smiled.

The fear reaction at 18 months was specific to the physician only and was gradually subsiding, though the frequent sight of this physician kept the association strong. The specific nature of the fear is shown by the fact that examination of her feet at 28 months by another physician produced no anxiety response. At 30 months a return to the first physician, involving removal of her clothing for a physical examination, revived the early fear. The reaction to the second, and milder, experience with the first physician resulted in a more acute and generalized reaction to all strange men and to any object reminiscent of a physician's office.

The problem of treatment was complicated by a situation of sibling rivalry, since at the time she was seen her fears were being capitalized to ensure her closeness to the mother. Besides, there was much dissension between the parents.

CASE 61.—*Anxiety-provoking experiences of operative procedures, starting at 16 months, in a child unusually sensitive to noise since birth.*

A boy aged 10 years 4 months, the older of two boys, was referred because he was "afraid of everything, including terrors and nightmares." In infancy he had had a strong startle reaction to noise. The mother noticed that he often "shuddered" in response to noise while sleeping and that he was "terror-stricken" when a door banged. At the age of 2 years, in a subway station, he shrieked whenever a train approached. Later, for several years, in the same situation he would put his hands to his ears. He reacted strongly to anything unfamiliar and yet presented no difficulty at 3 years of age when the family moved to another apartment. He was afraid of the dark from "infancy" to the age of 8 years. Then he asked to have lights turned out at

night, in order "to fight off" his fear. He also had a fear of moving pictures but in the two years previous to his referral had "forced himself to go."

Except for vaccination and injections of toxin-antitoxin at 6 months, to which he had no untoward reaction, his first operative procedure was a meatotomy because of a narrow urethral opening at 16 months of age. It was done by a quick incision without an anesthetic. At that time his only words were "da-da" and "no." Before the operation was done, he clamped his hand down over his penis. There were some struggling and crying. The mother held him in position for the operation.

A year later, when taken to the same physician for a general physical examination, he had "a look of terror" and asked, "He won't hurt the wee-wee?" (By 22 months he was using "good sentences.")

He had night terrors and "a terrified shriek" in his sleep preceding the age of 2 years and following the operation at 16 months. Almost nightly since the age of 4 or 5 years he shrieked, cried or just sat up in bed trembling. When he was about 2½ years of age, shortly before the birth of his baby brother, his mother told him how babies are born, in response to his questions. That night he had a night terror. He shrieked in his sleep. Awakened by his mother, he told her he had had a bad dream, in which he was in the belly of a donkey and couldn't get out.

At the age of 3½ years, because of enlargement and infection of his tonsils, a tonsillectomy was done. At the age of 4 years he had three major convulsions, with fever, in twenty-four hours. The next day a dentist removed an abscessed tooth, with the patient under gas anesthesia. He has had no convulsions since.

At 4½ years a number of moles of the hand were removed by excision. The mother held him again for this operation. It was during this period that a governess told him that if he masturbated his penis would be cut off.

Four or five weeks before he was referred, the maid found him with a rope around his neck, the other end tied to the doorknob. The maid asked what he was doing. He said he wanted to choke himself, but having changed his mind, turned it into a play.

His night terrors were of chopped-up hands, people chopped up and his trying to put them together unsuccessfully and especially a witch trying to kill him. In all his dreams it was a woman who attacked him. He actually had thought that his mother was plotting against him. "I always think she's going to plot on me, something I inherited, something I got." Frequently his dreams dealt with sensations of anesthesia and with his ideas of birth. He dreamed, for example, "of whirling around and around and going underground, and going underground, in a tunnel, and looking around. Still whirling around and around, and the little people were still there, when I woke out of the anesthetic, at the dentist's." His fears all resolved into a fear of castration by his mother. He insisted that he remembered the first operation clearly. He said, "My mother never told me. I remember it clearly. It was the same doctor and the same table I had my tonsils out. I was a baby. Maybe 1 or 2 years old. The way I picture it, I was 2 years old. I remember it hurt a lot. I was always scared about my penis being hurt but only on the tip. A lot of things happened to my penis. Once it hurt and swelled up where the blackhead is. My aunt told me to put a cold rag on it. I was scared I'd always have that pain and some one would have to rip it apart to get the pain out. They'd rip it apart and sew it up again. . . . It hurt because they used a thin knife. There's a line running in back of the penis, and if [illegible] cut at the tip, then the knife will go down the [illegible] and the penis will be cut all open. I get scared [illegible] I talk about it."

He thought that if they didn't put a hole in his [illegible] he would be unable to urinate, and his kidneys [illegible] burst.

His memory of the tonsillectomy was not so detai[illegible] He remembered there were many physicians, some [illegible] to the "hard" table and one off in a corner. He rem[illegible] bered that after the operation was over he was [illegible] on the "table."

Besides night terrors and his fears about his pe[illegible] he had fears of the dark, of staying at home alone[illegible] an illustrated Bible (because it had "scary" pict[illegible] in it), and of the room in which it was, of long h[illegible] ways and closets, of physicians and nurses and of g[illegible] places.

Of his play in early childhood a report from [illegible] nursery school teacher states that when he was 4 y[illegible] of age, his play "centered around the destruction [illegible] things" and threats toward his teacher of cutting [illegible] up, burning her up, etc. During a rest period he y[illegible] from his bed, "I'll cut my face off, I'll cut my head [illegible] I'll cut my hands off, I'll cut my wee-wee off."

CASE 65.—*Fear of the dark and protective measu[illegible] following an appendectomy.*

A boy, aged 12 years 7 months, an only child, [illegible] referred for stuttering. He had an appendectomy [illegible] 2½ years, and peritonitis developed. He had repea[illegible] dreams of the operation since that time, and fear of [illegible] dark developed. After the operation he slept with a [illegible] pistol under his pillow to the age of about 7 years.

When he was 4 years old, a tonsillectomy was p[illegible] formed, without any particular effect on his previ[illegible] fears. His memory of the first operation was as follo[illegible] "Just going into a room, a lot of doodads hanging fr[illegible] the ceiling, and crying my head off before they put [illegible] to sleep." He remembered someone's saying, "Blow i[illegible] the balloon," and then hearing a noise like a train a[illegible] being afraid of being run over. He remembered a phy[illegible] cian in white looking him over all the time in [illegible] operating room. By "doodads" he meant x-ray equ[illegible] ment. He remembered getting stubborn, crying and [illegible] wanting to blow into the balloon because he was afr[illegible] it would hurt him.

He reported a dream: "They brought me in the op[illegible] ating room. Then they looked over me a little [illegible] I don't know why they did that. Then they told me [illegible] blow up a balloon, and then, and then, and then, l[illegible] see. I know what I mean but I can't put it into wo[illegible] and I v-v-visualized that they cut a hole into me. I a[illegible] remember a hard table." "They" were men in white.

Items from the real operation appearing in the dre[illegible] were as follows: (1) blowing into a balloon; (2) m[illegible] in white looking him over; (3) the hard table.

CASE 71.—*A circumcision at 12 months, followed [illegible] fear of the dark and night terrors.*

A boy aged 3 years 7 months was referred for tem[illegible] tantrums, fears, restless behavior and night terrors. [illegible] had been circumcised at the age of 1 year; since th[illegible] fear of the dark and night terrors began.

CASE 75.—*Anxiety reactions without emotional [illegible] quelae following several paracenteses done with[illegible] anesthetic at the age of 2½ years. After another pa[illegible] centesis at 5½ years, acute fear of the anesthet[illegible] apparatus (tanks, tubes, etc.) rolling into the bedro[illegible] After that, fear of not knowing the mother's wh[illegible] abouts; fear of physicians and dentists.*

A girl aged 8 years 4 months was referred for [illegible] pendency and postoperative fears. Attacks of o[illegible]

ia had begun at the age of 2½ years. She had several ctures of the ear drum without anesthesia. She cried appeared anxious after each event, but there were no nite emotional sequelae. She was friendly with physis until the age of 5½ years. At this time an emercy paracentesis under ether was performed in her e at 3 a. m. When the anesthetist came in with his apparatus, she leaped out of bed, ran into the t room and screamed, "I'm not going to do it." physician and the nurse ran after her and carried back despite her struggles. About fifteen minutes r, when she awoke, she said, "Mummy," and then ted a dream about beautiful blue stars. She made parents promise they'd never do it again nor let physician give her "an injection." Since then she sted on knowing exactly where the parents were ng when they left her after supper and became erally more dependent on her mother. She also had rs of physicians and dentists.

The mother was given advice; the child was not ated directly. A follow-up when she was 11 years months old revealed that the problem of dependency fears of physicians and dentists was no longer sent, though fear of "injection" remained.

CASE 80.—*Specific fear of bandages for months after cut finger was bandaged, when the patient was months old.*

A girl aged 7 years 3 months was referred for negasm, fears and night terrors. She cut her finger at months of age, and her mother bandaged it. She eamed at the sight of bandages for months thereafter.

CASE 83.—*Fear of physicians and nurses for several nths after a tonsillectomy and incision of a cervical nd at 15 months. Fear of tongue depressors reining.*

A girl, aged 8 years 11 months, was referred for ling rivalry, negativism, mother-daughter antagonism d difficulty in sleeping. She had a tonsillectomy and ision of a cervical gland at 15 months of age. Fear physicians and all strangers followed and lasted eral months. At the time of writing she still fights ainst the insertion of a tongue depressor.

CASE 89.—*Rebellious behavior and delinquency in a ient who had previously presented no special bevior problems, after incision of a large infected cerial gland.*

A boy aged 16 years 1 month was referred for inrigibility. He had infected cervical glands at the e of 5 years. One abscess was "as large as an nge." The abscess was incised, and the fever subed. Since this illness, a change in personality was served. He became defiant of authority, stole and yed truant. There was considerable parental tenn. No problems had been present before the illness. the time of his referral physical examination revealed abnormalities. In view of the high fever and deium, it was difficult to relate the onset of the total nge in personality to his attitude toward the operon, although there was no evidence of encephalitis.

CASE 98.—*After two operations at 2 years of age aracentesis at 2 years 6 months and removal of tons and adenoids at 2 years 11 months) fear of strange ildings, of any one in a white coat or apron, of ing to a party, of darkness and of thunder. First rs to leave those of strange buildings and parties. fter 7 years of age only fear present that of thunder.*

A boy aged 9 years 2 months was referred for rebelus behavior and compulsive hitting. He had a paranteses of the ear at 2½ years. His tonsils and adeids were removed at 2 years 11 months, after which began to have fear of strange buildings. For several nths he was afraid to be with groups of children. He was afraid of any one in a white coat and of any man in an apron. He also had fears of the dark and of thunder. All fears except the fear of thunder were gone within twelve months. His comment about the operation at 9 years was: "I didn't get scared until I saw the tools."

CASE 106.—*Fear of physicians and dentists and of opening the mouth for examination after a surgical experience at 2 years of age.*

A boy aged 6 years 0 months was referred for fantastic lying. A cannula was inserted in his tear duct when he was 2 years old, because of continuous tearing. Thereafter he had a fear of physicians and dentists, which gradually subsided. At the time of writing he still fights against examination of his mouth.

His tonsils and adenoids were removed at 5 years of age. A tooth was extracted at the same age, apparently without any influence on his fears.

CASE 110.—*Screaming at the sight of any strange man, over a period of approximately six months following vaccination and examination of the ear at 19 months.*

A boy aged 4 years 4 months was referred for negativism and retardation (I. Q. 70). When 19 months old he was vaccinated, and his ears were examined daily for two week because of otitis media. For about six months thereafter he screamed at the sight of any man except his father. No paracentesis was done. He had a tonsillectomy at 3 years of age without emotional sequelae.

CASE 113.—*Fear of white coats after operative procedure at 6 months. After further operations increased anxiety reactions to anything unusual; besides fear of physicians and night terrors, fear of the dark, of the street, and of strange men.*

A girl, aged 5 years 7 months, the older of 2 girls, was referred for fears. At 6 months of age she had had some birthmarks removed, with local anesthesia induced with solid carbon dioxide. Thereafter the patient showed visible fright of any one in a white coat—physician, nurse or barber. The fear of the white coat persisted for several years. Taking her to the barber shop became an ordeal. The hair was cut despite her tears. The original fear was maintained, the mother thought, by a series of inoculations of the usual kinds, which ended when the patient was 12 months old.

At the age of 2 years 3 months a specimen of blood was taken for a Wassermann test. It had been found that a maid had a positive Wassermann reaction; thereupon the father insisted that every member of the family be tested. The physician wore an ordinary coat to avoid frightening the patient. It was difficult to get the specimen. One arm was tried, and then the other. The patient cried a great deal and was badly frightened by the procedure.

At the age of 5 years 6 months, a tonsillectomy was performed. The patient had been told she would just be examined at the hospital. After she was put to bed, she was picked up and placed on the table by the nurse and an orderly. She was frightened and screamed. She awoke from the anesthesia screaming. Screaming continued nightly for about one week. She said nothing to the mother about the operation. However, some weeks later she asked why the attendants wore white coats and masks.

A week after the operation, the patient became frightened of a neighbor boy, who had a peculiar manner of speech, when he said to her, "Will you play ball with me, little girl?" Afterward, she had night terrors and was afraid of the dark and of playing in the street.

It was difficult to get her into the playroom because of her fear of physicians. Once there, she played a game of a boy frightening a girl and one of herself

as a physician operating on a girl to remove her pimples.

CASE 114.—*A brief interval of night terrors, a fear of "odd" smells and increased dependency following a tonsillectomy at the age of 3 years 7 months.*

A girl aged 3 years 9 months was referred for feeding problems (refusal of solid foods) and night terrors. A tonsillectomy was performed at 3 years 7 months. She was well prepared. Since the operation she has had six night terrors. She dreamed of a man with a big nose coming after her. (Actually her surgeon had a big nose.) She had fears of any "odd" (out of the ordinary) smells and showed increased dependency on the mother. Before the operation she had been more than usually insistent on being with the mother, since the age of 2 years 9 months, when a baby brother was born.

CASE 117.—*Fear of closed rooms and suicidal impulses, with intensification of destructive behavior, following a circumcision at 6 years, 7 months.*

A boy aged 7 years 0 months the oldest of 3 children, was referred because of soiling, negativistic behavior, temper tantrums and suicidal impulses. His soiling started at the age of 6 years 3 months, when he was displaying intense jealousy of the younger sibling. At the same time he started baby talk and returned to the habit of taking his toy bunny to bed with him, a habit he had given up three years previously.

At 6 years 7 months of age he was circumcised because of a long foreskin. He was not told what was going to happen to him. He was brought into the hospital by his father and operated on immediately. While still under the influence of ether he was put into an automobile and taken home. While riding home in a state of anesthesia he repeated many times, "They cut my penis," and "I wish I were dead." He kept close to his mother the rest of that day, never leaving her side, and repeated the same statements.

In his play of the operation during treatment the patient became very active and dramatic. He had a boy escape from an automobile and shoot his father. Then, "the next day," the father, now resuscitated, got the boy as far as the elevator, whereupon the boy escaped, tore up the hospital sign, blew up the hospital and knocked the father down. A chase between father and son ensued. In the next play, he placed the father on the operating table, had the son in the role of surgeon and stuck a dart into the patient's neck. Killing the father, the physician, "more doctors" and then "more people" ended the play.

Asked about his actual memory of the operation, he stated that he didn't want to go to the hospital. His father forced him and the doorman fooled him. The doorman said, "There's a pigeon inside. You get into the car, and I'll catch the pigeon." That's how they got him into the car. When he knew he was fooled, he began to fight. The door was locked. He knew he was on the way to the hospital by the way his father acted. Since "that," he never goes near that hospital. When his father got him in, they took him up in the elevator. After he was upstairs, he tried to get down. After they put him "in the white thing," he got half dressed again. Then his father pushed him. "When they had the ether on, it looked as though you're seeing a lot of colors. It was red and yellow, and it got louder and louder and louder." He illustrated with loud noises. "I could see more and more colors, and the taste of it got more and more worse. When the voices got as terrible as it could go, and the taste got worse as it could go, then it stopped, and it wasn't long." After the operation he was dizzy, and he rode home in the car. The examiner asked what the operation was. He didn't know. I asked if he remembered saying "They cut my penis." He didn't.

The father reported that the anesthetic used for the operation was ethyl chloride. He felt he had to trick the child into going. The child fought against undressing, fought off the physicians and had to be forcibly anesthetized before they could get him undressed and to the operating room. The father and the anesthetist applied the force. The father felt "sick about it for a week," the whole experience was "brutal."

The patient had repressed the memory of the operation itself. When told about it, he interrupted and drew on paper a picture showing how they cut the foreskin off. When this was repeated in play, he said suddenly, "I'm trying to remember. I said, 'Buy me a gun and shoot me; if you don't, I'll shoot myself.' But he never recovered the memory of his saying, "They cut my penis."

After the operation there was an intensification of previous symptoms, especially the tantrums with destructive behavior. Until that time the tantrums were relatively mild. Suicidal impulses were first observed immediately after the operation. Fears of being in a room alone also developed thereafter, though the patient was not afraid of the dark. It developed into a true phobia. When he took a bath, the door had to remain open. If his mother closed it, he would jump out of the tub. The soiling problem preceded the operation and was most likely a response to sibling rivalry.

B. Some Cases Not Included in Table 1

CASE 15.—*Example of negativistic behavior of brief duration following a tonsillectomy in an obsessional and negativistic boy.*

A boy aged 8 years 0 months was referred for a hand washing mania, fears of touching food with his hands, fear of poison and also "negativism." At the age of 7 years 9 months a tonsillectomy was performed in a physician's office, with an ether anesthetic. He did not resist and took it well. His father was present. A hemorrhage occurred two days after the operation. Much pressure had been exerted against the tonsils. He had a temper for about a week afterward, refusing to talk or eat (negativism).

CASE 37—*Panicky closure of mouth during operation without evidence of postoperative fears.*

A boy aged 9 years 3 months was referred for impulsive hitting of children at school and enuresis. He was a premature baby, born three weeks early. He was clumsy. A tonsillectomy was performed at the age of 2 years, because of colds. He clenched his jaws. Clamps were tried, and finally a tooth had to be removed to get his mouth open.

CASE 46—*Reaction of persistent vomiting of two weeks' duration following a tonsillectomy at 9 years in a patient with tics.*

A boy aged 11 years 0 months was referred for tics and fears, which had had their onset at 3 years of age. In infancy he was "a very nervous baby," sensitive to the slightest draft. He had "a nervous look." He cried frequently in the first year. The mother had "a hyper thyroid condition" when the patient was 10 months of age, and a thyroidectomy was performed on her when the child was 12 months old. The mother was separated from the child for six to eight months, as a result.

A tonsillectomy was performed because of tonsillitis and frequent colds, when the patient was 9 years old. The patient vomited excessively for two weeks. At the age of 11 years 4 months his memory of the operation was: "I had to get up at 6, very early. I felt very nervous, naturally, but I was very good. My regular

Summary of All Cases Studied

Case	Sex	Age Yr.	Age Mo.	Referral Problems	Operations	Reaction
1	♂	9	8	Disobedience	Tonsillectomy 6 yr.	Negative
2	♂	11	10	Tics, temper tantrums, impulsive behavior	Tonsillectomy 10 yr.	Negative
3	♂	8	11	Tics, sleep talking	Tonsillectomy and adenoidectomy 5 yr.	Negative
4	♂	12	10	Shyness, crying easily	Tonsillectomy 4 yr.	Negative
5	♂	10	6	Fears	Tonsillectomy 8 yr. 8 mo.	Negative
6	♂	14	0	Undisciplined behavior, parental overindulgence	Tonsillectomy 5 yr., after which no bronchitis	
7	♂	6	10	Fears, submissiveness (conduct too good)	Tonsillectomy 2 yr. 10 mo.	Negative
8	♂	6	0	Night terrors	Tonsillectomy 3 yr.	See report of case
9	♀	15	7	Disobedience, dependency	Mastoidectomy 10 yr.	Negative
10	♀	4	9	Hairpulling	Tonsillectomy 4 yr. 4 mo.	Negative
11	♂	13	10	Disobedience, school difficulty, I. Q. 148	Tonsillectomy 7 yr. 6 mo.	Negative
12	♂	14	0	Retardation	Tonsillectomy 4 yr.	Negative
13	♂	12	4	Social difficulty, sibling rivalry, father-son antagonism	Tonsillectomy 2 yr. because of tonsillitis	Negative
14	♂	5	2	Advice re telling children about adoption, feeding problem	Circumcision 14 mo.	Negative
15	♂	8	0	Hand washing mania, fears of touching food with hands, fear of poison, negativism	Tonsillectomy 7 yr.	See report of case
16	♂	11	2	Enuresis	Tonsillectomy 3 yr.	Negative
17	♀	5	1	Negativism, temper tantrums	Tonsillectomy 4 yr. 7 mo.	See report of case
18	♂	15	11	School difficulty, truanting, stealing	Tonsillectomy and adenoidectomy 5 yr.	Negative
19	♂	15	0	School difficulty	Operation 15 yr., accident sledding: internal hemorrhage, fracture, injury to kidney and spleen; spleen removed; 2 operations 3 weeks before referral	Negative for present evidence of anxiety; marked irritability; swore at doctors, etc. 1-2 wk.
20	♂	12	7	Disobedience, accessory movements	Appendectomy 7 yr.; tonsillectomy and adenoidectomy 12 yr.	No further feeding problem (inappetence)
21	♂	9	10	Effeminacy	Tonsillectomy and adenoidectomy 3 yr. because of mouth breathing; several accidents	Negative
22	♀	3	5	Mind "full of fears," night terrors once a week	Laceration of scalp at 18 mo. when she accidentally ran her head thorugh a window pane while reaching for doll	See report of case
23	♂	5	9	Disobedience, incorrigibility at school	Meatotomy 2 yr. 11 mo.	See report of case
24	♀	10	9	Stealing	Tonsillectomy 16 mo.; only a few words at time; cried a good deal before operation and afterward when taken home; occasionally for a week, and then normal	Never gave any indication later that she remembered it
					Appendectomy 9 yr.	Negative; no evidence of any fear
25	♀	8	6	School difficulty, stealing, temper tantrums (mutism)	Tonsillectomy and adenoidectomy 4 yr., because of "infected tonsils"	Negative
26	♂	16	3	Undisciplined behavior following death of father	Appendectomy 4 yr.; stone submaxillary gland 9 yr.	Negative
27	♀	4	0	Stuttering, negativism	Tonsillectomy 3 yr.	See report of case
28	♀	17	0	School difficulty, fears	Tonsillectomy 10 yr.	Negative
29	♂	12	10	School difficulty, social difficulty with children	Tonsillectomy 3 yr.	Several days cranky, crying and fussing
30	♂	11	2	Routine study	Appendectomy 9 yr.	Negative
31	♀	7	2	Speech problem, crying spells	Tonsillectomy and adenoidectomy 2½ yr.	See report of case
32	♂	22	0	Sleep walking, fear, stealing	Tonsillectomy 15 yr.	Negative
33	♀	16	6	Social difficulty	Tonsillectomy 2½ and 5 yr.	Negative
34	♂	8	9	Immaturity	Tonsillectomy and adenoidectomy 3 yr.; paracentesis 5 yr.	Negative
35	♀	10	5	Mother-daughter antagonism	Tonsillectomy and adenoidectomy 5 yr.	Negative
36	♀	7	10	Temper tantrums, disobedience	Tonsillectomy 9 yr. 2 mo.	See report of case
37	♂	9	3	Impulsive hitting of children at school, enuresis	Tonsillectomy 3 yr. because of colds	See report of case
38	♂	10	1	Stealing	Paracentesis 5 yr. and 7 yr.; tonsillectomy and adenoidectomy 4 or 5 yr.	Negative
39	♂	3	8	Speech, sibling rivalry (chiefly in terms of aggression)	Tonsillectomy 3 yr. 4 mo.	See report of case
40	♂	17	6	School retardation	Adenoidectomy 3¼ yr.; operation for undescended testicle 4½ yr.	Negative
41	♂	11	0	Compulsive hitting, tics	Tonsillectomy and adenoidectomy 3 yr.; appendectomy 10 yr.	Negative
42	♂	4	3	Fears, vomiting spells	Tonsillectomy 4 yr.	See report of case
43	♂	7	6	Negativism, temper tantrums	Tonsillectomy 2 yr.	Negative
44	♀	10	4	Social and school difficulty, masculinity	Tonsillectomy and adenoidectomy 4 yr.; fractured skull on horseback 8 yr.	Negative
45	♂	11	8	School difficulty, I. Q. 158	Tonsillectomy and adenoidectomy 3 yr.; fractured right arm 4 yr. and used left arm saisfactorily	Negative
46	♂	11	0	Tics, fears	Tonsillectomy 9 yr.	See report of case
47	♂	8	10	Psychic vomiting, fears	Tonsillectomy and adenoidectomy 2 yr. 3 mo.; circumcision 3 yr. 8 mo.	See report of case
48	♂	11	2	Postoperative fears	Tonsillectomy 4 yr.; adenoidectomy 11 yr.	See report of case
49	♂	16	7	Stealing, lying, social difficulty	Tonsillectomy 2 yr.; operation for strabismus 8 yr.	Negative

Summary of All Cases Studied—Continued

Case	Sex	Age Yr.	Age Mo.	Referral Problems	Operations	Reaction
50	♂	14	5	Fears	Tonsillectomy 6 yr.	Negative
51	♀	15	7	Social difficulty, mother-daughter antagonism	Bilateral mastoidectomy 5 yr.	Negative
52	♂	15	2	Obsessional neurosis, rituals, spitting compulsions, fear of soap, toilet dawdling	Tonsillectomy 10 yr.	Negative
53	♂	13	5	Insomnia	Tonsillectomy 2 yr.; osteomyelitis at 8 yr., 2 operations	Negative
54	♀	9	10	Temper tantrums, sibling rivalry..	Tonsillectomy 5 yr.	Negative
55	♂	13	1	Laziness, effeminacy, stuttering....	Tonsillectomy 2 yr.	Negative
56	♂	8	7	Hyperactivity, sleep difficulty.....	Abscess of arm with draining 2 yr.; tonsillectomy and adenoidectomy 2 yr.; paracentesis ear 4 yr.	Negative
57	♂	7	3	Fears	Tonsillectomy 4 yr.	Negative
58	♀	7	8	Fears, night terrors.....	Tonsillectomy 4 yr. 7 mo.	"Thought doctor w lovely and hospi fun;" discusses " operation"
59	♀	14	2	Mother-daughter antagonism, negativism	Tonsillectomy 5 yr.	"A wonderful pati
60	♀	2	0	Fear of physicians.....	Illness with injection in buttocks 18 mo.	See report of case
61	♂	10	4	Fears, night terrors.....	Meatotomy 16 mo.	See report of case
62	♂	5	8	Compulsive movements	Cyst of leg removed 2½ yr.; tonsillectomy 3½ yr.	See report of case
63	♂	6	1	Excited speech	Tonsillectomy and adenoidectomy 5 yr.	Negative
64	♂	7	0	Acute anxiety of two weeks' duration	Tonsillectomy 5 yr. 2 mo.; fractured arm 6 yr.	Negative
65	♂	12	7	Stuttering	Appendectomy and peritonitis 2½ yr.; tonsillectomy 4 yr.	See report of case
66	♀	12	2	Reading, speech	Tonsillectomy 7 yr.	Negative
67	♂	17	0	Passivity	Bilateral mastoidectomy 5 yr.; tonsillectomy 5½ yr.; in that period, fracture of arm	Negative
68	♂	8	0	Disobedience, temper tantrums.....	Tonsillectomy 2 yr. 3 mo.	Negative
69	♀	7	4	School difficulty, stealing	Tonsillectomy 5 yr.	Negative
70	♂	11	7	Enuresis	Tonsillectomy and adenoidectomy 3 yr.; appendectomy	Negative
71	♂	3	7	Temper tantrums, fears, restless behavior, night terrors	Circumcision 1 yr.	See report of case
72	♂	16	3	Accidents	Fractured elbows 2½ yr.; frequent fractures since	Negative
73	♀	12	5	Mental retardation	Tonsillectomy and adenoidectomy 7 yr.	Negative
74	♂	13	9	Sex perversion	Tonsillectomy and adenoidectomy 9 yr.	Negative
75	♀	8	4	Dependency and postoperative fears	Otitis media 5½ yr.	See report of case
76	♂	13	4	Negativism	Tonsillectomy 9 yr.	Negative
77	♂	14	4	School difficulty, social difficulty, stealing	Tonsillectomy 3 yr.; circumcision 5 yr.; appendectomy 9 yr.	Negative
78	♂	7	3	Temper tantrums, sibling rivalry...	Cervical gland incised 12 mo., at hospital	Negative
79	♂	7	8	Nail picking, negativism.....	Tonsillectomy 6 yr.; appendectomy 6½ yr.	Negative
80	♀	7	3	Negativism, fears, night terrors....	Cut finger 18 mo., bandaged by mother	See report of case
81	♀	11	0	Insomnia, fears	Tonsillectomy and adenoidectomy 3 yr.	Negative
82	♀	5	2	Negativism, "dreamy states," mental retardation (I. Q. 75)	Adenoidectomy 15 mo.	Negative
83	♀	8	11	Sibling rivalry, negativism, mother-daughter antagonism, sleep difficulty	Tonsillectomy 15 mo. and cervical adenitis; gland incised	See report of case
84	♂	9	4	Fears, sibling rivalry.....	Tonsillectomy and adenoidectomy 5 yr.	Negative
85	♂	8	7	Shy, submissive behavior.....	Tonsillectomy 6 yr.; fractured wrist 6½ yr.	Negative
86	♂	9	1	Fears	Tonsillectomy and adenoidectomy 8 yr.	Negative
87	♂	4	7	Enuresis, fears, restlessness.....	Tonsillectomy and adenoidectomy 2 yr.	Negative
88	♂	4	3	Stuttering	Tonsillectomy and adenoidectomy 2 yr.	Negative
89	♂	16	1	Incorrigibility	Abscess incised 5 yr.	See report of case
90	♀	17	10	Social difficulty, suicidal threats....	Tonsillectomy 7 yr.	Negative
91	♂	6	0	Dependency	Tonsillectomy and adenoidectomy 2½ yr.; paracentesis ear 5 yr.	Negative
92	♀	16	0	Delinquency, sex difficulty, stealing	Tonsillectomy 3 yr.	Negative
93	♂	12	9	Fears	Tonsillectomy 2 yr.; fractured skull 2 yr.; concussion 7 yr.	Negative
94	♀	14	0	Mother-daughter antagonism	Tonsillectomy 6 yr.	Negative
95	♂	11	9	Fears, school difficulty.....	Mastoidectomy 5 yr.; tonsillectomy 5½ yr.	Negative
96	♀	8	9	Night terrors	Tonsillectomy 3 yr.	Negative
97	♀	13	1	Fears	Appendectomy 11 yr.	Negative
98	♂	9	2	Rebelliousness, impulsiveness	Paracentesis ear 2½ yr.; tonsillectomy and adenoidectomy 2 yr. 11 mo.	See report of case
99	♀	6	6	Masculinity complex	Tonsillectomy 5 yr.	Negative
100	♂	11	8	Destructive behavior, stealing, school difficulty	Fractured arm 5 yr.; tonsillectomy 9 yr.	Negative
101	♀	2	9	Head rolling	Paracentesis ear 4 mo.	Negative
102	♂	12	1	School difficulty	Tonsillectomy and adenoidectomy 4 yr.	Negative
103	♂	11	7	Fears	Tonsillectomy and adenoidectomy 4 yr.	See report of case
104	♀	7	2	Masturbation	Tonsillectomy 6 yr.	Negative
105	♂	13	11	School retardation, (Froelich) I. Q. 85	Tonsillectomy 4 yr.; second tonsillectomy 6 yr.	Negative

Summary of All Cases Studied—Continued

Case	Sex	Age Yr.	Age Mo.	Referral Problems	Operations	Reaction
106	♂	6	0	Fantastic lies	Cannula in tear duct 2 yr.	See report of case
107	♂	14	0	Rebellious behavior, temper tantrums	Tonsillectomy and adenoidectomy 6 yr.	Negative
108	♂	13	0	Passivity	Operation for strabismus 8 yr.	Negative
109	♀	6	0	Fear of being left alone	Cyst of eyeball removed under ether 4 yr.; tonsillectomy 5½ yr.	Negative
110	♂	4	4	Negativism, retardation (I. Q. 70)	Vaccination and ear examination daily for 2 wk., because of otitis media; tonsillectomy 3 yr.	See report of case
111	♂	8	8	Reading disability	Tonsillectomy and adenoidectomy 3 yr.	Negative
112	♂	10	6	Stuttering	Meatotomy 3 yr.	Negative
113	♀	5	7	Fears	Birthmarks removed 6 mo.; Wassermann test 2 yr. 3 mo.; tonsillectomy 5 yr. 6 mo.	See report of case
114	♀	3	9	Feeding problem (refusal of solid food), night terrors	Tonsillectomy 3 yr. 7 mo.	See report of case
115	♀	12	2	Negativism, temper	Tonsillectomy 4 yr.; excision splinter under local anesthetic 7 yr.; fractured arm 9 yr.	Negative
116	♂	10	6	Stealing	Tonsillectomy 3 yr. Automobile accident 6 yr. Abscessed leg incised 10 yr.	Negative Night terrors several years
117	♂	7	0	Soiling, onset 6 yr. 3 mo., negativistic behavior, temper tantrums, suicidal impulses	Circumcision 6 yr. 7 mo.	See report of case
118	♀	12	2	Poor work in school	Paracentesis ear 4 yr.; operation on eye 8 yr.	Negative
119	♂	7	0	Enuresis, night terrors	Tonsillectomy and adenoidectomy 5 yr.	Negative
120	♂	11	2	Night terrors, fears	Tonsillectomy 3 yr.	Negative
121	♀	4	10	Shyness, timidity, wanting attention	Tonsillectomy 2 yr. 11 mo.	Negative
122	♀	7	5	Enuresis	Operation for strabismus 5 yr.	Negative
123	♀	8	10	Fears, sibling rivalry	Tonsillectomy 7 yr.	Negative
124	♂	14	6	School difficulty	Tonsillectomy 4 yr.	Negative

ctor, Dr. C., was there. I forgot who took it out. lay down on a cot. They put a towel over me. They t a funny machine over my face. I could see a little t through the towel. Then the smell started. It was ough to make you vomit. They told me to count. I pt counting. I don't know how far I got. I kept inking, should I let them do it, or should I not let em do it? I counted 15, 16 and then faded away. he next thing I knew I was counting 18, 19, 20. Then my mind I had a flash of Superman streaking by. hen I said to myself, more seriously, should I let em do it, or should I not, lots of times, and more reaks of Superman. The next thing I knew, I was in clean, white bed, dizzy, with a slight pain in my roat. I felt very sick. Then after a while my mother d a nurse were there, and I was very sick, and I rew up a lot. The vomiting kept up for two weeks."

His only reaction was persistent vomiting, a repetition erformance as in tics.

CASE 62.—*Crying and wild fighting on recovering rom anesthesia after an operation for a cyst of the g at 2½ years, the mother being alone with the atient at the time. No postoperative fears.*

A boy aged 5 years 8 months was referred for compulsive movements, which had begun at the age of 4 ears 6 months. A cyst of the leg below the knee was removed with the patient under ether anesthesia when he was 2½ years old. When he recovered from the anesthesia, he started to cry and fight. His mother couldn't hold him. She was alone with him at the time. A tonsillectomy was performed at 3½ years of age, because of frequent sore throat. He was not told in advance about the operation. When out of the anesthesia he asked, "Why am I here?" his mother told him, and he accepted her explanation.

There was no evidence of emotional sequelae from either operation. The compulsive movements (a compulsive turn to the right to "correct" any turn to the left) were apparently related to a masturbation threat and preceded the operation.

CASE 103.—*Example of a latent fear following a tonsillectomy and evoked after a masturbation threat and seeing a frightening moving picture. After the last event fear of the dark, of crowds and of sickness developed.*

A boy aged 11 years 7 months was referred for fears. At the age of 4 years 0 months his tonsils and adenoids were removed. He remembered it, "the whole thing." He remembered he was "scared stiff." It was 4 o'clock in the afternoon. He was put into pajamas. He was so frightened that he had to have his mother near. At 7 o'clock he was told to go to bed. He remembered nothing further until he awoke at midnight and asked for his mother. He didn't remember any ether. They just gave him a spoonful of something. He wasn't told about anything. He didn't even know he was in the hospital until he saw the nurses.

Fear after the tonsillectomy was probably latent until he saw a moving picture, "Hansel and Gretel," at the age of 5 years. Shortly before this time his mother warned him about the danger of masturbation, telling him how he might hurt his penis and would then need an operation. The fear caused by "Hansel and Gretel" was of the witch's tooth—"one tooth in a hideous mouth." He was afraid after that of "a false set of top teeth taken out," like those of his governess. The sequence of events was the tonsillectomy, the masturbation threat and the moving picture. The acute anxiety followed the third event and probably began with a night terror. Then fear of the dark developed. He slept with a sheet over his head and insisted on keeping his bedroom door open. Fear of crowds and of sickness also developed. He displayed no fear of physical danger or of fighting. In fact, he was unusually good in sports of all kinds and rode horseback well. His fear of castration was clearly revealed in his play during treatment.

136 East Fifty-Seventh Street.

RESISTANCE OF COTTON RATS TO THE VIRUS OF POLIOMYELITIS

AS AFFECTED BY INTAKE OF VITAMIN B COMPLEX, PARTIAL INANITION AND SEX

H. M. WEAVER

WITH THE TECHNICAL ASSISTANCE OF NORMA HASTINGS AND HELEN AMMON

DETROIT

The clinical studies by Huffman,[1] McCormick [2] and Helms [3] have indicated that vitamin B deficiency, particularly when accompanied by physical overexertion, may increase the susceptibility of a host to the virus of poliomyelitis. Favorable results in cases of acute anterior poliomyelitis have been said to follow vitamin B therapy.[4]

In direct refutation are the clearcut results of the studies by Foster, Jones, Henle and Dorfman.[5] These investigators found that the death rate of mice inoculated with the virus of poliomyelitis was much greater for those animals which were fed a diet high in thiamine. Even more striking was the finding that the incidence of paralysis in mice which were fed a diet high in thiamine was several times greater than in mice which were fed a diet deficient in thiamine. These observations have been confirmed by Rasmussen, Waisman, Elvehjem and Clark [6] and by Toomey, Frohring and Takacs.[7]

Foster, Jones, Henle and Dorfman [8] found that mice on a diet deficient in thiamine showed increased resistance to the Lansing strain of the poliomyelitis virus. In a more recent communication [9] these authors reported that simple restriction of the intake of food to about 40 per cent of the usual daily consumption produced comparable results. Increasing the concentration of thiamine in the diet so that the amount of thiamine which was consumed by the animals whose total intake of food was restricted was at least double the amount which was consumed by the animals whose total intake of food was unrestricted did not increase the incidence of paralysis or of death. These results were partially confirmed by the investigations of Rasmussen, Waisman, Elvehjem and Clark,[6] who found that the expected incidence of paralysis was slightly decreased by a restriction of the number of calories but did not approach the low percentage incidence that resulted when intake of both calories and thiamine was limited.

It is the purpose of the present communication to record the results of a number of experiments which were designed to test the effects of vitamin B complex–free diets, of partial inanition and of sex on the susceptibility and on certain immunologic responses of cotton rats to the Armstrong-Lansing strain of the virus of poliomyelitis.

MATERIALS

The Armstrong-Lansing strain of the virus of poliomyelitis which has been adapted to the cotton rat was employed in these studies. The unfiltered, lightly centrifuged stock suspensions of the virus were prepared exclusively from the brain stems and spinal cords of paralyzed cotton rats which had been stored in buffered glycerin at 5 C. for a period not exceeding two months. During the course of this investigation, samples of the stock virus suspensions were injected in large quantities (intracerebrally, intranasally, intraperitoneally and subcutaneously) into albino rats, wild rats, guinea pigs and Syrian hamsters. With the exception of the hamsters, all of these animals remained well. On three occasions a disease resembling anterior poliomyelitis occurred in the hamsters which had been inoculated with the virus. In 1 of the 3 cases we were not successful in transferring the virus to other hamsters, and in the remaining 2 cases transfer was successful but

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1. Huffman, O. V.: Lancet-Clinic **105**:310, 1911.

2. (*a*) McCormick, W. J.: Canad. M. A. J. **38**: 261, 1938; (*b*) M. Rec. **150**:302, 1939; (*c*) **155**:89, 1942; (*d*) **155**:525, 1942.

3. Helms, K.: M. J. Australia **1**:717, 1941.

4. Hamburger, F.: Wien. klin. Wchnschr. **51**:825, 1938. Mathews, A. P.: Vitamins, Minerals and Hormones, Baltimore, William Wood & Company, 1937. Stern, E. L.: Am. J. Clin. Med. **45**:108, 1938. Broekema, H.: Maandschr. v. kindergeneesk. **8**:193, 1939. Giamondi, A.: Pediatria **48**:48, 1940. Helms.[3] McCormick.[2c,d] Stone, S.: J. Pediat. **22**:142, 1943.

5. Foster, C.; Jones, J. H.; Henle, W., and Dorfman, F.: Proc. Soc. Exper. Biol. & Med. **51**:215, 1942.

6. Rasmussen, A. F.; Waisman, H. A.; Elvehjem, C. A., and Clark, P. F.: J. Infect. Dis. **74**:41, 1944.

7. Toomey, J. A.; Frohring, W. O., and Takacs, W. S.: Yale J. Biol. & Med. **16**:477, 1944.

8. Foster, C.; Jones, J. H.; Henle, W., and Dorfman, F.: Proc. Soc. Exper. Biol. & Med. **51**:215, 1942.

9. Foster, C.; Jones, J. H.; Henle, W., and Dorfman, F.: Science **97**:207, 1943.

beyond the first passage generation. These findings re not unexpected, in view of the successful passage this strain of the virus to Syrian hamsters by Armong.[10] On two occasions samples of the stock virus pensions produced paralytic anterior poliomyelitis en inoculated intracerebrally into Macacus rhesus nkeys. Suspensions of the spinal cords from each these monkeys produced paralytic anterior polioelitis when inoculated intracerebrally into cotton rats. The cotton rats employed in our studies were obtained m the Michigan Department of Health Laboratories. The basic diet, which was fed continuously to the trol animals, was composed of a mixture of natural ds as follows: cane molasses, peanut oil meal, soy n oil meal, animal liver meal, fish meal, meat scraps, densed buttermilk, corn gluten, wheat bran, wheat r middlings, ground whole oats, ground whole yellow n, ground hulled barley, ground whole wheat, whole k powder, alfalfa leaf meal, A and D feeding oil Rockland Farms product), steamed bone meal, salt precipitated chalk.

The vitamin B complex–free diet used in these eximents consisted of the following substances: sucrose, 80 Gm.; casein, 1,080 Gm.; hydrogenated cottonseed 480 Gm.; U. S. P. salt mixture no. 2, 240 mg., and liver oil, 120 Gm.

EXPERIMENTAL PROCEDURE

The rats were weaned at 25 days of age and divided o two groups according to sex. These animals were n used for 11 experiments in which the virus was inistered to vitamin B complex-deficient and to con- rats and for a twelfth experiment in which the ct of the virus on rats given supplementary vitamin complex was observed. The procedure in the first 11 periments was as follows:

The animals of each of the two groups were fed basic diet ad libitum until they were 6 weeks age. At this time one half of the cotton rats in h group were fed the vitamin B complex-free diet. e other half of the animals in each group continued receive the basic diet. Thus the animals were divided o two groups of approximately equal numbers of amin B complex-deficient males, control males, vitan B complex-deficient females and control females. was felt that this grouping would demonstrate difential susceptibility and immunologic response deident on sex or nutrition.

The control animals which were fed the basic diet libitum thrived, presented no striking abnormalities d exhibited no particular susceptibility to intercurrent fections. Each of the control rats consumed approxitely 10 Gm. of the basic diet daily. On the other nd, the cotton rats which were fed the vitamin B mplex–free diet ad libitum grew only slightly, showed ossly almost no deposition of fat, lost considerable ir and exhibited increased susceptibility to infections the respiratory tract. Each of these rats consumed proximately 5 Gm. of the vitamin B complex–free t daily.

When each animal attained the age of 8 weeks, the rus of poliomyelitis was administered by one of several fferent experimental methods. In 2 experiments the rus was injected into the brain; in 5 it was injected instilled into certain parts of the alimentary tract; 1 it was instilled into the external nares, and in the remaining experiments it was administered through rtain unusual portals.

Each vitamin B–deficient rat was returned to the basic diet two weeks after it had been inoculated with the virus, in order to prevent death resulting from vitamin B deficiency.

Each animal was observed morning and evening for twenty-five days after administration of the virus. Any animal remaining free of symptoms during this interval was subjected to a three way reinoculation (0.1 cc. given intracerebrally, 0.5 cc. subcutaneously in the back and 0.06 cc. intranasally) with a 10 per cent suspension of the virus. Cotton rats remaining free of symptoms for another twenty-five days were subjected to a second three way reinoculation with the virus. Any animal failing to show symptoms of poliomyelitis after the first (or original) inoculation and two three way reinoculations with the virus was considered immune.

Each cotton rat said to have contracted poliomyelitis after its first inoculation with the virus, when the latter was administered by any route other than the intracerebral, satisfied the following four requirements: 1. Flaccid paralysis developed within twenty-five days after the virus was first administered, and observations of the animal at frequent intervals showed progressive paralysis. 2. Samples of the central nervous system showed histologic changes characteristic of anterior poliomyelitis. 3. The remaining portions of the central nervous system of the paralyzed cotton rat, when made up into a 10 per cent saline suspension and injected intracerebrally into 3 previously untreated cotton rats, reproduced symptoms of the disease in at least 1 of the 3 animals. 4. At least 1 of the 3 passage animals showed histologic changes in its central nervous system which are characteristic of anterior poliomyelitis.

All animals which contracted poliomyelitis were permitted to live twenty-four hours after paralysis was first observed. At the end of this period the extent of paralysis was recorded and the animal killed. The relative susceptibility of the cotton rats which contracted poliomyelitis after inoculation with the virus was judged from the number of extremities paralyzed and from the length of the incubation period (defined here as the number of days between the time of inoculation with the virus and the time the rat died or was killed). Any cotton rat in which paralysis developed in two or more extremities within fifteen days of an inoculation was considered to have no unusual resistance to the antigen.

In the twelfth experiment constant doses of the virus were injected intracerebrally into cotton rats which had been fed or inoculated with various quantities of crystalline vitamin B complex.

RESULTS

Part 1. Comparative Susceptibility of Vitamin B Complex–Deficient and Control Rats Subjected to Single Intracerebral and to Three Way Inoculations.

EXPERIMENT 1.—Each cotton rat was subjected to a three way inoculation (0.1 cc. given intracerebrally, 0.5 cc. subcutaneously in the back and 0.06 cc. intranasally) with a 10 per cent suspension of the virus. Table 1 summarizes the results of this experiment.

Of these animals, only 1 vitamin B complex–deficient female failed to contract poliomyelitis after its first inoculation with the virus. It did,

10. Armstrong, C., in Infantile Paralysis: A Symsium Delivered at Vanderbilt University, April 1941, ew York, National Foundation for Infantile Paralysis, c., 1941, p. 49.

TABLE 1.—*Results of Three Way Inoculation with the Virus*

Animals	Number of Animals	Average Incubation Period,* Days	Extent of Observable Paralysis (Extremities)
B-deficient rats	34	5.18 (3-11)	3.39 (2-4)
Control rats	25	5.12 (3-9)	3.28 (2-4)
Males	22	5.00 (3-9)	3.45 (2-4)
Females	37	5.25 (3-11)	3.28 (2-4)
B-deficient males	13	4.92 (3-9)	3.54 (2-4)
Control males	9	5.11 (3-9)	3.33 (2-4)
B-deficient females	21	5.35 (3-11)	3.30 (2-4)
Control females	16	5.13 (3-8)	3.25 (2-4)

* Used in this communication to indicate the number of days which elapsed between the time of inoculation with the virus and the time the animal died or was killed.

however, become completely paralyzed in six days after a three way reinoculation.

EXPERIMENT 2.—Each cotton rat was subjected to an intracerebral inoculation with 0.05 cc. of a 1 per cent suspension of the virus. Table 2 summarizes the results of this experiment.

Of these animals, 1 vitamin B–deficient male and 1 control male contracted the disease after a prolonged incubation period only; 2 vitamin B–deficient and 3 control males and 5 vitamin B–deficient and 2 control females failed to contract

TABLE 2.—*Results of Intracerebral Inoculation with the Virus*

Animals	Number of Animals	Average Incubation Period,* Days	Extent of Observable Paralysis (Extremities)
B-deficient rats	27	7.05 (4-12)	3.26 (2-4)
Control rats	28	7.18 (2-15)	3.45 (2-4)
Males	32	7.16 (2-15)	3.36 (2-4)
Females	23	7.06 (3-12)	3.38 (2-4)
B-deficient males	14	7.27 (5-12)	3.27 (2-4)
Control males	18	7.07 (2-15)	3.43 (2-4)
B-deficient females	13	6.75 (4-11)	3.25 (2-4)
Control females	10	7.37 (3-12)	3.50 (2-4)

* Used in this communication to indicate the number of days which elapsed between the time of inoculation with the virus and the time the animal died or was killed.

poliomyelitis after their first inoculations with the virus. (These 14 animals are not included in the summary presented in table 2.)

Of the 12 animals which remained free of symptoms after their first inoculation, 2 vitamin B–deficient and 2 control males and 2 vitamin B–deficient and 2 control females contracted the disease within the usual incubation period after th had been subjected to a three way reinoculati One control male and 3 vitamin B–deficie females resisted two three-way reinoculations.

Part 2. Comparative Susceptibility of Vi min B Complex–Deficient and Control Ra Subjected to Inoculations with the Virus in Different Parts of the Alimentary Tract.

EXPERIMENT 3.—Each cotton rat devour one brain stem and spinal cord which had be freshly removed from a cotton rat paralyz with poliomyelitis. Table 3 summarizes th results of this experiment.

EXPERIMENT 4.—Each cotton rat received submucosal injection of 0.5 cc. of a 10 per ce

TABLE 4.—*Results of Submucosal Injection of the Virus*

Animals	Number of Animals	Paralyzed in 2 or More Extremities Within Usual Incubation Period: After Experimental Inoc.	After First Reinoculation	After Second Reinoculation	Resista to 2 Three Way Reinoc lation
B-deficient males	6	0	0	0	6
Control males	6	0	0	0	6
B-deficient females	7	1	1	0	5
Control females	6	0	0	0	6

suspension of the virus into each of the regio which in certain animals other than cotton ra house the palatine tonsils. Table 4 summariz the results of this experiment.

EXPERIMENT 5.—Each cotton rat was su jected on each of three successive days to

TABLE 5.—*Results of Intragastric Instillation of the Virus*

Animals	Number of Animals	Paralyzed in 2 or More Extremities Within Usual Incubation Period: After Experimental Instill.	After First Reinoculation	After Second Reinoculation	Resista to 2 Three Way Reinoc lation
B-deficient males	6	0	6	0	0
Control males	7	0	6	0	1
B-deficient females	6	0	5	0	1
Control females	7	0	7	0	0

single intragastric instillation of 1 cc. of a

TABLE 3.—*Results of Feeding One Brain and Spinal Cord to Each Rat*

Animals	Number of Animals	Paralyzed in 2 or More Extremities Within Usual Incubation Period: After Experimental Feeding	After First Reinoculation	After Second Reinoculation	Resistant to 2 Three Way Reinoculations
B-deficient males	6	0	6	0	0
Control males	6	0	6	0	0
B-deficient females	6	0	4	0	2
Control females	7	0	7	0	0

TABLE 6.—*Results of Intracolonic Instillation of the Virus*

Animals	Number of Animals	Paralyzed in 2 or More Extremities Within Usual Incubation Period: After Experimental Instill.	After First Reinoculation	After Second Reinoculation	Resista to 2 Three Way Reinoc lation
B-deficient males	6	0	4	0	2
Control males	6	0	5	0	1
B deficient females	6	0	4	0	2
Control females	6	0	5	0	1

r cent suspension of the virus administered means of a stomach tube. Table 5 summarizes the results of this experiment.

EXPERIMENT 6.—Each cotton rat was subcted on each of three successive days to a gle intracolonic instillation of 1 cc. of a 10 r cent suspension of the virus administered means of a rectal tube. Table 6 summarizes e results of this experiment.

TABLE 7.—*Results of Intraperitoneal Inoculation*

Animals	Number of Animals	Paralyzed in 2 or More Extremities Within Usual Incubation Period: After Experimental Inoc.	After First Reinoculation	After Second Reinoculation	Resistant to 2 Three Way Reinoculations
deficient males...	6	1	0	0	5
ntrol males.....	6	0	0	0	6
deficient females	6	0	0	0	6
ntrol females...	6	0	0	0	6

EXPERIMENT 7.—Each cotton rat was subcted on each of three successive days to a gle intraperitoneal inoculation with 1 cc. of a per cent suspension of the virus. Table 7 mmarizes the results of this experiment.

Part 3. Comparative Susceptibility of Vitain B Complex–Deficient and Control Rats bjected to Intranasal Instillations of the Virus.

EXPERIMENT 8.—Each cotton rat was subcted during the morning and again during e evening on each of three successive days to

TABLE 8.—*Results of Intranasal Instillation of the Virus*

Animals	Number of Animals	Paralyzed in 2 or More Extremities Within Usual Incubation Period: After Experimental Instill.	After First Reinoculation	After Second Reinoculation	Resistant to 2 Three Way Reinoculations
deficient males...	6	0	6	0	0
ntrol males.....	6	0	5	0	1
deficient females	6	0	5	1	0
ntrol females...	7	0	6	0	1

n intranasal instillation of a suspension of the rus of poliomyelitis. On each of these occasions 05 cc. of a 10 per cent suspension of the rus was dropped into each nostril. Table 8 mmarizes the results of this experiment.

Part 4. Comparative Susceptibility of B-Decient and Control Rats Subjected to Injections the Virus Through Unusual Portals.

EXPERIMENT 9.—Each cotton rat was subcted on each of three successive days to a bcutaneous inoculation with 1 cc. of a 10 per cent suspension of the virus. Table 9 summarizes the results of this experiment.

TABLE 9.—*Results of Subcutaneous Inoculation with the Virus*

Animals	Number of Animals	Paralyzed in 2 or More Extremities Within Usual Incubation Period: After Experimental Inoc.	After First Reinoculation	After Second Reinoculation	Resistant to 2 Three Way Reinoculations
B-deficient males...	6	0	0	0	6
Control males.....	6	0	1	0	5
B-deficient females	6	0	1	0	5
Control females...	6	0	0	0	6

EXPERIMENT 10.—Each cotton rat was subjected to a single intracardiac inoculation with 0.5 cc. of a 10 per cent suspension of the virus. Table 10 summarizes the results of this experiment.

TABLE 10.—*Results of Intracardiac Inoculation with the Virus*

Animals	Number of Animals	Paralyzed in 2 or More Extremities Within Usual Incubation Period: After Experimental Inoc.	After First Reinoculation	After Second Reinoculation	Resistant to 2 Three Way Reinoculations
B-deficient males...	7	1	3	0	3
Control males.....	6	1	3	0	2
B-deficient females	6	1	2	0	3
Control females...	6	2	1	0	3

EXPERIMENT 11.—Each cotton rat was permitted to live in the same cage with another cotton rat which had been subjected to a three way inoculation with the virus. The experimental cotton rat remained in intimate contact with the inoculated animal until the latter became completely paralyzed. Table 11 summarizes the results of this experiment.

TABLE 11.—*Results of Contact Between an Inoculated and an Uninoculated Animal*

Animals	Number of Animals	Paralyzed in 2 or More Extremities Within Usual Incubation Period: After Experimental Exposure	After First Reinoculation	After Second Reinoculation	Resistant to 2 Three Way Reinoculations
B-deficient males...	7	0	5	0	2
Control males.....	6	0	6	0	0
B-deficient females	6	0	6	0	0
Control females...	7	0	6	0	1

Part 5. Comparative Susceptibility to Intracerebral Injections of Control Rats and Rats Subjected to Increased Intake of Vitamin B.

EXPERIMENT 12.—For purposes of comparative study the animals were divided into six groups, as follows: Those in group I (14 males and 13 females) were fed the vitamin B complex–free diet, beginning two weeks prior to their inoculation. Those in group II (18 males and 10 females) served as controls and were fed the basic diet. Beginning nine days prior to their inoculation with the virus, those in group III (12 males and 8 females) were fed the vitamin B complex–free diet fortified with one hundred times the daily minimal requirements of crystalline B complex.[11] Those in group IV (4 males and 8 females) were subjected to the same treatment as those in group III except that they were fed the fortified diet beginning fifteen days prior to their inoculation. Beginning seven days prior to their inoculation, those in group V (6 males and 5 females) were fed the vitamin B complex–free diet and in addition were subjected to daily subcutaneous injections of an aqueous suspension containing 200 times the daily minimal requirements of crystalline B complex.[12] Those in group VI (7 males and 7 females) were subjected to the same treatment as those in group V except that they were fed the basic diet instead of the vitamin B complex–free diet.

Each of the animals in this experiment received an intracerebral inoculation with 0.05 cc. of a 1 per cent suspension of the virus when it reached 8 weeks of age. The experimental procedures just outlined for each group were continued for three weeks after each animal had been subjected to intracerebral inoculation with the virus. All animals remaining alive at this time were returned to the basic diet. Table 12 summarizes the results of this experiment.

11. To 3,000 Gm. of vitamin B complex–free diet was added the following:

Thiamine	2.4 Gm.
Riboflavin	4.8 Gm.
Pyridoxine	3.6 Gm.
Nicotinic acid	6.0 Gm.
Calcium pantothenate	3.0 Gm.

(Richardson, L. R.; Hogan, A. G.; Long, B., and Itschner, K. I.: Proc. Soc. Exper. Biol. & Med. **46**: 530, 1941.)

12. One and five-tenths cubic centimeters of the following suspension in 250 cc. of sterile distilled water was injected daily:

Thiamine	4.0 Gm.
Riboflavin	8.0 Gm.
Pyridoxine	6.0 Gm.
Calcium pantothenate	5.0 Gm.
Nicotinic acid	10.0 Gm.

(Richardson, L. R.; Hogan, A. G.; Long, B., and Itschner, K. I.: Proc. Soc. Exper. Biol. & Med. **46**: 530, 1941.)

TABLE 12.—*Results of Intracerebral Inoculation with the Virus in Rats Subjected to Increased Intake of Vitamin B, in Rats Fed the Basic Diet and in Rats Fed the Vitamin B–Free Diet*

Animals	Number of Animals	Paralyzed in 2 or More Extremities Within Usual Incubation Period: After Experimental Inoc.	After First Reinoculation	After Second Reinoculation	Resistant to 2 Three Way Reinoculation
Males:					
Group I	14	11 (1)*	2	0	0
Group II	18	14 (1)*	2	0	1
Group III	12	10	1	0	1
Group IV	4	4	0	0	0
Group V	6	3 (1)*	2	0	0
Group VI	7	6	0	0	1
Females:					
Group I	13	8	2	0	3
Group II	10	8	2	0	0
Group III	8	8	0	0	0
Group IV	8	6	1	0	1
Group V	5	5	0	0	0
Group VI	7	7	0	0	0

* After prolonged incubation period only.

The average incubation periods and the extent of observable paralyses of the groups of animals in this experiment are illustrated in table 13.

COMMENT

None of these experiments yielded results which indicate that susceptibility to the virus of poliomyelitis is related to vitamin B complex deficient diet, to partial inanition or to sex. In each of two experiments (intratonsillar and intraperitoneal) 1 vitamin B–deficient rat only contracted anterior poliomyelitis without being subjected to an intracerebral inoculation with the virus. These exceptional instances are probably due not to vitamin B deficiency but to chance; in previous investigations[13] it was shown that animals fed the basic diet occasionally

TABLE 13.—*Relative Susceptibility to the Poliomyelitis Virus of the Rats in Experiment 12*

Animals	Average Incubation Period, Days	Extent of Observable Paralysis (Extremities)
Group 1		
Males	7.27 (5-12)	3.27 (2-4)
Females	6.75 (4-11)	3.25 (2-4)
Group II		
Males	7.07 (2-15)	3.43 (2-4)
Females	7.37 (3-12)	3.50 (2-4)
Group III		
Males	7.30 (3-12)	3.00 (2-4)
Females	7.63 (3-11)	3.75 (2-4)
Group IV		
Males	7.75 (7-10)	4.00 (4)
Females	6.67 (3-9)	3.67 (2-4)
Group V		
Males	9.33 (6-12)	3.33 (2-4)
Females	5.60 (2-8)	4.00 (4)
Group VI		
Males	9.00 (7-11)	3.33 (2-4)
Females	5.29 (3-7)	3.14 (2-4)

13. Weaver, H. M.: J. Pediat. **24**:88, 1944.

ntracted anterior poliomyelitis after an injection of the virus into the "tonsillar areas" or to the peritoneal cavity.

More important, these experiments indicate at neither vitamin B complex–deficient diets or partial inanition renders permeable to the rus of poliomyelitis those barriers in the cotton t which are normally impermeable. Finally, ese studies indicate that after experimental oculations vitamin B–deficient diets, partial anition and sex have no significant influence the ability of cotton rats to build up subantial resistance to the virus of poliomyelitis.

The results of one additional experiment are corded in which cotton rats were administered tracerebral inoculations with the virus of polioyelitis after they had been subjected to varying vels of intake of vitamin B. Of the six fferent groups of animals in this experiment, l showed essentiallly the same response to the rus except those which had previously received queous suspensions of vitamin B complex by ily subcutaneous injections. Among the latter imals, the males exhibited an unusually proged and the females an unusually shortened cubation period. It is believed that should ese changes in susceptibility to the virus of oliomyelitis be related to vitamin B intake one, it would be reasonable to assume that the o sexes would respond similarly. Although e results of this experiment (experiment 12) e not clearcut, they do not support (1) the ypothesis that increased intake of vitamin B mplex serves as a prophylactic against anterior oliomyelitis or the hypothesis that (2) administration of vitamin B complex has specific therapeutic value after the virus of poliomyelitis has vaded the central nervous tissues.

Neither do the results of the work reported this communication support the findings of oster, Jones, Henle and Dorfman,[9] of Rasussen, Waisman, Elvehjem and Clark[6] or of oomey, Frohring and Takacs[7] insofar as these uthors asserted that diets low in thiamine and artial inanition decrease the susceptibility of e host to the paralyzing and lethal effects of e Armstrong-Lansing strain of the virus. We e fully aware of the fact that these studies are ot in all points comparable with ours. However, the differences in response shown on the e hand by mice and on the other hand by otton rats, even though they were subjected similar nutritional stresses and inoculated with e same strain of the virus, illustrate the danger applying directly to human beings the results animal experimentation.

The results of the experiments reported in this communication are, with one exception, in general agreement with those of somewhat similar experiments conducted during studies on avitaminosis D.[13] In this earlier work it was shown that cotton rats subjected to intracardiac inoculations with 0.5 cc. of a 10 per cent suspension of the virus of poliomyelitis failed to show symptoms of the disease but did in 80 per cent of the cases manifest complete resistance to subsequent intracerebral inoculations with the virus. Contrasting with these results was our experiment 10 performed during the course of the current study. In this experiment it was found that after an intracardiac inoculation with 0.5 cc. of a 10 per cent suspension of the virus of poliomyelitis 20 per cent of the animals contracted the disease, while 36 per cent did so only after a three way reinoculation with the virus administered twenty-five days later, and 44 per cent built up complete resistance to subsequent intracerebral inoculations with the virus. We are unable to explain satisfactorily this variability in the susceptibility of cotton rats to intracardiac inoculations with the virus of poliomyelitis.

The results of our experiments offer no evidence in support of the theory that the virus of poliomyelitis is a biochemical by-product of vitamin B deficiency and that poliomyelitis is a fulminant form of beriberi.

The results of the present investigation are in agreement with our previous conclusion[13] that in the cotton rat the Armstrong-Lansing strain of the virus of poliomyelitis produces paralysis only occasionally when it is introduced otherwise than by injections directly into the cerebrum. In the present study, in 7 animals only could infection of the tissues of the central nervous system be produced by extracerebral injections of relatively large quantities of the virus (intratonsillar [1 animal, 4 per cent], intraperitoneal [1 animal, 4 per cent] and intracardiac [5 animals, 20 per cent]).

The findings reported in this communication agree with our previous experience. We found[13] that the majority of cotton rats build up complete resistance to intracerebral inoculations if the inoculations are preceded by intratonsillar, intraperitoneal or subcutaneous injections. A lesser percentage of cotton rats acquire this resistance after intranasal, intracolonic or intragastric instillations of relatively large quantities of the virus, after contact with a cotton rat succumbing to the disease or after devouring a brain stem and spinal cord which has been infected with the virus of poliomyelitis.

SUMMARY AND CONCLUSIONS

Eleven experiments were performed designed to test the effects of vitamin B complex–free diets, of partial inanition and of sex on the susceptibility and on certain immunologic responses of cotton rats to the virus of poliomyelitis.

Suspensions of the Armstrong-Lansing strain of the virus of poliomyelitis were injected or instilled in varying quantities into the cerebrum, stomach, colon, peritoneal cavity, external nares and blood stream, beneath the skin of the back and beneath the pharyngeal mucosa. In addition, the animals of one experimental group were allowed to remain in intimate contact with cotton rats succumbing to the effects of intracerebral inoculations with the virus. Finally, each cotton rat of still another experimental group was fed the brain stem and spinal cord freshly removed from a cotton rat paralyzed with poliomyelitis.

Each of the cotton rats which failed to have paralysis after an experimental inoculation with the virus was subjected to three way reinoculations with the virus at intervals of twenty-five days.

The results of this work yield no evidence to indicate that vitamin B complex–free diets, partial inanition or sex significantly affects susceptibility of cotton rats to the Armstro Lansing strain of the virus of poliomyeli Furthermore, we find no indication that resistance of cotton rats to three way reinocu tions with the virus, administered subsequer to any of the experimental inoculations, is fluenced by vitamin B complex–free diets, partial inanition or by sex.

The results of one additional experiment recorded in which intracerebral inoculations the virus were administered to cotton rats a they had been subjected to varying levels of v min B intake. The results of this experim do not support (1) the hypothesis that increa intake of vitamin B complex serves as a prop lactic against anterior poliomyelitis or (2) hypothesis that administration of vitamin B c plex has specific therapeutic value after the v of poliomyelitis has invaded the tissues of central nervous system.

The results of our experiments offer no dence in support of the theory that the virus poliomyelitis is a biochemical by-product vitamin B deficiency and that poliomyelitis i fulminant form of beriberi.

Case Reports

GENERALIZED VACCINIA IN AN ECZEMATOUS CHILD

DEMONSTRATION OF VIRUS AND COMMENT ON "KAPOSI'S VARICELLIFORM ERUPTION"

FALLS B. HERSHEY, M.D., AND WILLIAM E. SMITH, M.D.

BOSTON

Generalized vaccinia is an uncommon but ious complication of vaccination, surveys plac- the incidence at 1 in 20,000 to 1 in 96,000 cinations and the case fatality rate at 12 to per cent.[1] About two thirds of the persons in om this complication occurs have diseases of skin; many are children with eczema. There- e, although the disease itself is uncommon, it stitutes a real danger to persons with cuta- us diseases, and warnings have been sounded inst vaccination of such persons and against ir exposure to recently vaccinated persons. e subject has been discussed in several recent iews.[2]

Generalized vaccinia in persons with eczema s been called eczema vaccinatum. Clinically ilar conditions in persons with eczema or er cutaneous diseases have been called Ka- i's varicelliform eruption or pustulosis varioli- mis acuta when there was no history of pre- ling vaccination or of contact with recently cinated persons, or when vaccine virus could t be demonstrated in the lesions.[3] It has been ggested that the eruptions known under these ee names are identical and that the vaccine us is the causative agent.[3] Recently, how- er, herpes virus has been recovered in certain ses.[4]

The present paper describes an instance of neralized vaccinia in an eczematous child. ethods of demonstrating the vaccine virus are scussed. The appropriateness of the terms Kaposi's varicelliform eruption and pustulosis varioliformis acuta is commented on.

REPORT OF A CASE

A 12 month old girl was admitted to the Massachusetts General Hospital Sept. 8, 1942 because of a recent exacerbation of eczema. Her brother had been vaccinated twelve days before her admission. The patient had not been vaccinated.

On her admission to the hospital the patient's temperature was 99.5 F. Numerous weeping red areas with some crusting were present on the scalp, the face and the neck. Dry, scaly erythematous lesions were present elsewhere, particularly on the extremities. There was generalized lymphadenopathy, especially of glands in the neck. Bilateral chronic otitis media was the only other abnormal finding.

Clinical Course.—The course was not remarkable until the seventh day in the hospital, when the patient's temperature rose to 102.5 F. and the skin of the head became greatly swollen. Raised, umbilicated pustules were observed on the face three days later. Similar new pustules appeared during the next four days, chiefly on the face, scalp and arms, in or near the areas of eczema. Some pustules became confluent. A few pustules developed in apparently healthy skin on the chest. The baby was very sick. Her temperature ranged between 101 and 104 F. for eight days, after which it gradually declined. The pustules dried, scabs formed and the secondary infection in the pustules and eczematous lesions subsided.

A level of sulfadiazine in the blood of about 10 mg. per hundred cubic centimeters was maintained between the seventh and fifteenth days in the hospital. This treatment was without apparent effect on the vaccinia. Considerable improvement occurred between the eighteenth and twenty-third days in the hospital, but thereafter a decubitus ulcer of the scalp developed and became infected. A level of sulfadiazine in the blood of about 10 mg. per hundred cubic centimeters was again established. The ulcer was treated for two days with sulfathiazole ointment and then for six days with compresses containing 300 Florey units of penicillin per cubic centimeter; after this treatment healing occurred.

The patient was discharged with moderately severe eczema fifty-two days after her admission.

Laboratory data.—The red blood cell count ranged between 4,800,000 and 3,000,000 cells per cubic millimeter. The white blood cell count rose from 11,650 cells per cubic millimeter on the patient's admission to 43,000 during the febrile period. The urine was not remarkable.

Bacteriologic Findings.—A culture of the blood on the seventh day in the hospital was sterile. Repeated cultures from the infected eczema lesions and pustules and from the decubitus ulcer yielded beta hemolytic streptococci and coagulase-positive hemolytic Staphylococcus aureus.

Demonstration of Virus.—Guarnieri bodies were not found in Giemsa-stained smears of scrapings from three

From the Departments of Pediatrics and of Pathology d Bacteriology, Massachusetts General Hospital.

1. (*a*) Jubb, A. A.: Generalized Vaccinia, Brit. J. **1**:91 (Jan. 23) 1943. (*b*) Ross, R. A.: Generalized Vaccinia, in Virus and Rickettsial Diseases, mbridge, Mass., Harvard University Press, 1940.

2. (*a*) Jubb.[1a] (*b*) Ross.[1b] (*c*) Bergman, R., and ndahl, J.: Eczema Vaccinatum in Connection with elve Cases, Nord. hyg. tidskr. **22**:175, 1941. (*d*) ollnitza, E.: Beiträge zur Frage der Vaccinia neralisata und Nachweis des Virus im Urin, Arch. f. rmat. u. Syph. **177**:186, 1938. (*e*) McKhann, C. F., d Ross, R. A.: Generalized Vaccinia and Eczema ccinatum, M. Clin. North America **22**:785 (May) 38.

3. Tedder, J. W.: Eczema Vaccinatum, Arch. rmat. & Syph. **34**:1008 (Dec.) 1936.

4. (*a*) Esser, M.: Ueber eine kleine Epidemi von stulosis varioliformis acuta, Ann. pædiat. **157**:156, 41. (*b*) Wenner, H. A.: Complications of Infantile zema Caused by the Virus of Herpes Simplex, Am. Dis. Child. **67**:247 (April) 1944.

day old pustules. Immediate inoculation within the skin and onto the scarified cornea of a rabbit of suspensions of these scrapings in broth was uneventful. Inoculation of a second rabbit's cornea, however, resulted in keratoconjunctivitis, and Guarnieri bodies were seen in epithelial cells scraped from this eye three days after inoculation.

Demonstration of Protective Antibodies.—Varying dilutions of commercial glycerinated vaccine virus [5] were mixed with equal quantities of 0.9 per cent sodium chloride solution, with the patient's serum taken six weeks after the onset of the disease, with immune serum from a recently vaccinated person and with nonimmune serum from an unvaccinated child 3 years of age. These mixtures were incubated thirty minutes at 37 C., and 0.1 cc. quantities were then injected intradermally into a rabbit. The results are recorded in the accompanying table. It is seen that the patient's serum and the serum of the person known to be immune gave considerable protection, whereas the serum of the nonimmune person failed to give significant protection.

Fig. 1.—Eczema vaccinatum. Note that the umbilicated pustules of vaccinia have developed almost exclusively on the head and the arm, where the skin was injured by eczema. Except that there are a few pustules on the chest, areas of healthy skin were spared.

*Titration of Protective Antibody Against Vaccine Virus**

Dilution of Virus	Sodium Chloride Solution	Virus Mixed With: Nonimmune Serum	Virus Mixed With: Patient's Serum	Virus Mixed With: Immune Serum
1/40	8 10 10	8 10 10	0 4 4	0 2 2
1/200	8 10 10	8 10 10	.....	.....
1/400	1 4 4	.....	.....	.....
1/800	.....	.....	.....	.....

* Each number indicates the occurrence of a papule and gives its diameter in millimeters. The 3 columns of numbers under each heading are, from left to right, the readings at forty-eight, seventy-two and ninety-six hours.

COMMENT

Hypersusceptibility of Persons with Cutaneous Disease to Vaccine Virus.—The clinical diagnosis of generalized vaccinia was supported by recovery of vaccine virus through animal inoculation and through demonstration of protective antibodies against vaccine virus in the patient's blood. The hypersusceptibility of eczematous children to the vaccine virus is emphasized by this case, in which the patient, though not herself vaccinated, contracted the disease from a vaccinated sibling. Great care may be necessary for proper protection of persons with cutaneous diseases against recently vaccinated persons. In addition to transmission by direct contact or by fomites, transmission by droplet infection should be guarded against. Vaccine virus has been demonstrated in the nasopharynx on the fourth and fifth days after vaccination.[6] It has also been recovered from urine,[2d] a fact which further attests its hematogenous distribution.

Treatment of Vaccinia.—Transfusions from vaccinia-immune persons have been recommended as a possible method of combating virus disseminated by the blood.[7] Vaccinia and variola virus are destroyed by potassium permanganate and compresses saturated with this solution have been advised to inhibit local spread by autoinoculation.[8] In the present case, secondary infection due to pyogenic cocci was severe. The chemotherapy employed to combat it appeared effective and may have been an important factor in the patient's recovery, since streptococci were reported in antemortem cultures of the blood in 7 of a group of 8 cases of fatal smallpox, an indication that death may be due in large part to these secondary invaders.[9]

Causation of Vaccinia and Similar Diseases.—The descriptive term eczema vaccinatum could readily be applied to the condition just described. The terms Kaposi's varicelliform eruption and pustulosis varioliformis acuta are listed in Sutton's textbook [10] as synonyms for eczema vacci-

5. Dr. Geoffrey Edsall, of the Massachusetts State Antitoxin Laboratory, supplied this virus and recommended the method.

6. Gins, H. A.; Hackenthal, H., and Kamenzew N.: Neue Erfahrungen und Versuche ueber Generalisierung des Vakzinevirus, Centralbl. f. Bakt. (Abt. I) **110**:115 (Jan. 24) 1929.

7. Facey, R. V.: Encephalitis with Skin Eruption (Generalized Vaccinia) After Vaccination: Transfusion of Immune Blood, Lancet **2**:669 (Dec. 5) 1942.

8. Gordon, M. H.: Vaccinia as a Complication of Vaccination, Correspondence, Brit. M. J. **2**:822 (Dec. 6) 1941.

9. Perkins, R. G., and Pay, G. O.: Streptococci Pyogenes in Variola, J. M. Research **10**:180 (Oct.) 1903.

10. Sutton, R. L., and Sutton, R. L., Jr.: Diseases of the Skin, ed. 10, St. Louis, C. V. Mosby Company, 1939.

tum, a fact which emphasizes the close clinical milarity of the eruptions that have been described under these three names. Some authors no have used the terms Kaposi's eruption and stulosis varioliformis found Guarnieri bodies thognomonic of vaccinia in the lesions.[11] Others ve made no effort to recover viruses.[12] Some these authors have attributed the eruptions ey saw to various pyogenic cocci, which may ve been merely secondary invaders, since early stules in one epidemic were sterile.[4] Still her authors have sought for inclusion bodies d have made inoculations of animals, with gative results.[13]

Until recently, therefore, there was no positive idence that the eruptions under discussion uld be due to any agent other than the vaccine rus. In 1941, Esser[4a] observed a small ward idemic of "pustulosis varioliformis" in Switzerd involving 4 babies with eczema. She inoculated rabbit cornea with material from the lesions. Keratoconjunctivitis resulted and was transmitted to other rabbits. Guarnieri bodies were not found. Rabbits in which this keratoconjunctivitis developed were subsequently susceptible to vaccine virus but immune to herpes virus. Esser concluded that the eruption was due to a herpes-like virus.

In 1944, Wenner[4b] observed 3 eczematous babies in New Haven who had cutaneous lesions corresponding to those described as Kaposi's varicelliform eruption. Material from blisters of each patient and from the brain of 1 baby who died produced in rabbits a keratoconjunctivitis which was frequently extended to cause encephalitis. Eosinophilic intranuclear inclusions were found in the cornea and the brain. Guarnieri bodies were not seen. Rabbits immunized with the agents from these patients were resistant to herpes simplex virus. From this result and from serologic evidence Wenner concluded that the agent from each subject was a virus closely related to, if not identical with, the virus of herpes simplex. It would therefore appear that the

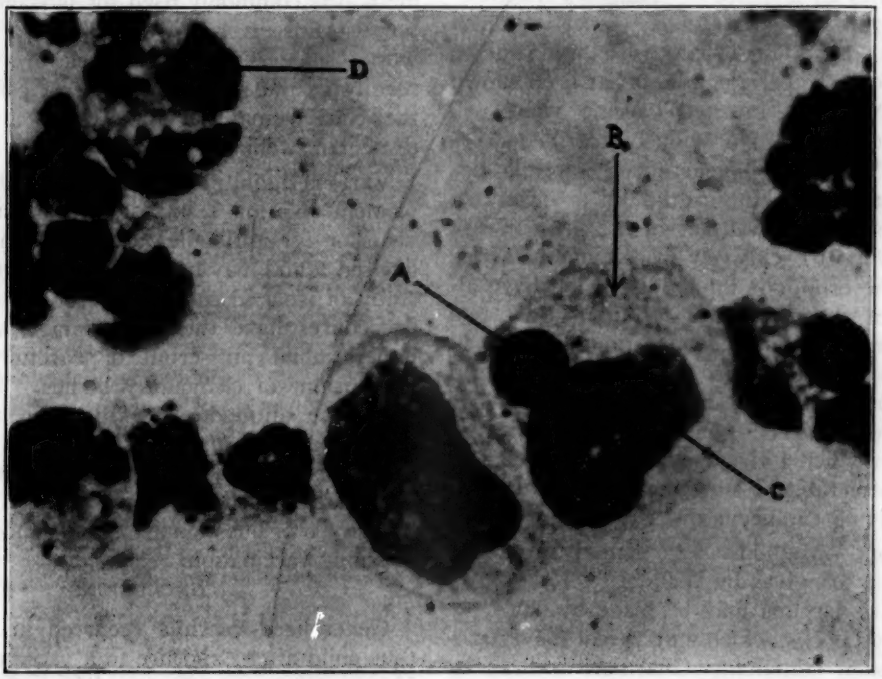

Fig. 2.—Scrapings from the cornea of a rabbit three days after inoculation with a scab from the patient. Giemsa ain; × 2,000. *A*, Guarnieri inclusion body in the cytoplasm of an epithelial cell; *B*, cytoplasm; *C*, nucleus; , polymorphonuclear leukocyte.

11. Freund, H.: Zur Aetiologie der Pustulosis varioliformis acuta, Dermat. Wchnschr. **98**:52 (Jan. 13) 934. Pepple, A. W.; Murrell, T. W., and Fowlkes, . W.: Varicelliform Eruption of Kaposi, South. M. J. 6:667 (July) 1942.

12. (*a*) McLachlan, A. O., and Gillespie, M.: Kaposi's aricelliform Eruption: Epidemic of Sixteen Cases, rit. J. Dermat. **38**:337 (July) 1936. (*b*) Streitman, .: Ueber Varioliformis Pyodermien, Arch. f. Dermat. Syph. **178**:99, 1938. (*c*) King, A. D.: Kaposi's aricelliform Eruption: Report of Five Cases in One Which the Condition Began as Herpes Zoster, Arch. ermat. & Syph. **39**:1035 (June) 1939.

13. Freud, P.: Ueber Pustulosis Varioliformis Acuta, Monatschr. f. Kinderh. **51**:28, 1931. Frühwald, R.: Pustulosis vacciniformis acuta beim Erwachsenen, Dermat. Wchnschr. **99**:922 (July 14) 1934. Brain, R. T., and Lewis, B.: Investigation of Virus Diseases of Skin with Report of Case of Kaposi's Varicelliform Eruption, Brit. J. Dermat. **49**:551 (Dec.) 1937. Bettley, F. R.: Kaposi's Varicelliform Eruption: Some Experimental Findings, ibid. **52**:222 (July) 1940.

vaccine virus and the herpes virus are capable of giving rise to similar eruptions in the skin of eczematous children.

Recent small epidemics have been reported under each of the three names eczema vaccinatum, Kaposi's eruption and pustulosis varioliformis. These epidemics occurred in wards for patients with cutaneous diseases[14] or with burns,[15] the vaccine virus being recovered from some patients and the herpes virus from others. As to the considerable number of patients that failed to yield either vaccinia or herpes virus despite appropriate inoculation of animals, the possibility must be kept in mind that some other virus, as a likely illustration that of chickenpox, may have become localized in the injured skin. King[12c] cites an instance of "Kaposi's eruption" which "began as herpes zoster." Localization of viruses at points of injury is a well known phenomenon. Experimentally it has been shown that intravenously injected vaccine virus will give rise to pocks in previously scarified areas of skin.[16] Clinically, generalized vaccinia has been observed in skin injured by a variety of dermatoses.[17] The pustules in the present case occurred almost exclusively in eczematous areas.

Since the eruptions under discussion have already been shown to arise from at least two different viruses, one may question the wisdom of preserving the terms Kaposi's varicelliform eruption or pustulosis varioliformis acuta, which would appear to designate a specific disease. In cases in which a virus has been demonstrated, it seems preferable to state the virus and specify the underlying cutaneous disease, if there is any.

Diagnosis.—Methods for demonstration of herpes virus are given by Wenner.[4b] Laboratory diagnosis of vaccinia may be made by biopsy of the patient's pocks, which may reveal the characteristic lesion containing Guarnieri bodies; by inoculation into animals, or by serologic methods. In the present case, Guarnieri bodies were seen in scrapings from the inoculated cornea of a rabbit. The exudate of the associated purulent bacterial conjunctivitis was washed away, and scrapings were made with a knife in order to obtain epithelial cells, which are the cells that show Guarnieri bodies. Paul's test[18] consists of enucleation of the eye two to three days af inoculation and fixation of the eye for minute in a solution of 2 parts 6 per cent m cury bichloride and 1 part dehydrated alcoh The lesions are then seen as discrete papul whose macroscopic appearance is regarded sufficiently characteristic to be diagnostic. D fries and McKinnon[19] in an extensive stu with material from patients with smallpox fou that Paul's test gave positive results in only h the cases, whereas intradermal injection almo invariably resulted in the production of a papu The demonstration of Guarnieri bodies in his logic sections of corneal or cutaneous lesio establishes the diagnosis with certainty.

Inoculation of the rabbit's testis, though th method is commonly used for passage of labor tory strains, is not well suited for diagnos work, since Guarnieri bodies are not fou readily in the testis and bacteria contaminati the clinical material may cause a misleadi testicular swelling.

Various agglutination, precipitation and co plement fixation tests for variola and vacci virus or for antibodies against them have be devised[20] and may be useful in epidemics. In t study of isolated cases, however, these serolog procedures have the disadvantage of requiri either rabbit antiserum or carefully prepar suspensions of elementary bodies. The test f protective antibodies[20] utilized in the pres case requires no materials which are not read available. As with all serologic tests, positi results may not be obtained early in the disea or may be of questionable significance because previous vaccination.

CONCLUSIONS

Generalized vaccinia occurred in an eczem tous child after exposure to a vaccinated sibli Vaccine virus was recovered from the cutaneo lesions, and antibodies against this virus we demonstrated in the serum of the patient.

Agents closely resembling the herpes simpl virus have recently been recovered from simi eruptions known as Kaposi's varicelliform eru tion or pustulosis varioliformis acuta. The eruptions also occur in patients with eczema a were formerly considered identical with eczem vaccinatum. A considerable number of patien have failed to yield either vaccinia or herp virus, despite appropriate tests. This fact m be due to the localization of yet other viruses the areas of injured skin offered by these patien

14. Bergman and Lindahl.[2c] McLachlan and Gillespie.[12a] Esser.[4a]

15. Nimpfer, T.: Ueber Variola-Vacciniainfektion von Brandwunden im Verlaufe einer Stationsinfektion, Arch. f. Dermat. u. Syph. **174**:518, 1936.

16. Calmette, A., and Guérin, C.: Recherches sur la vaccine expérimentale, Ann. Inst. Pasteur. **15**:161, 1901.

17. Becker, S., and Obermayer, M.: Modern Dermatology and Syphilology, Philadelphia, J. B. Lippincott Company, 1940.

18. Paul, G.: Zur Differentialdiagnose der Variola und der Varicellen, Centralbl. f. Bakt. (Abt. 1) **75**: 518 (March 13) 1915.

19. Defries, R. D., and McKinnon, N. E.: T Laboratory Diagnosis of Smallpox Virus Using Rabbit, Am. J. Hyg. **8**:107 (Jan.) 1928.

20. Van Rooyen, C., and Rhodes, A.: Virus Disea of Man, London, Oxford University Press, 1940.

Progress in Pediatrics

SALICYLATE POISONING

REPORT OF FOUR CASES

MARY MAHER TROLL, M.D., AND MAUD L. MENTEN, M.D., PH.D.

PITTSBURGH

Although the administration of salicylates is mmonly not associated with untoward effects, casionally therapy with these drugs may be companied by medical hazards for patients who ve an idiosyncrasy or susceptibility to these ugs. The type of ester radical may detri- ntally influence the toxicity; the methyl ester particularly toxic. Fatal results may ensue er ingestion of methyl salicylate; approxi- tely 80 deaths from this cause have been re- rted to date. Such fatalities may follow very all doses of this compound. Four cubic centi- eters of oil of wintergreen taken by a child of ½ years caused death (Lawson and Kaiser [1]), d 6 cc. was fatal to an adult (Stevenson [2]).

Most of the deaths reported have been caused methyl salicylate, probably because of the fact at this compound is more toxic than other licyl compounds in equivalent doses. However, e other salicylates may be toxic, and an increas- g number of poisonings following their thera- utic administration have been reported in re- nt years. This fact should be borne in mind ith regard to patients under salicylate therapy. ecognition of the clinical picture associated with xicity due to salicylate and early institution of rrective therapy can materially assist in reduc- g the mortality.

Inasmuch as salicylates are used so extensively the care of patients with cardiac ailments, it is emed worth while to report further examples intoxication following the use of these drugs. our cases of salicylate poisoning which occurred in this hospital are reported in this paper. One child died after therapy with acetylsalicylic acid and a second after accidental swallowing of oil of wintergreen. A third child, who had prolonged salicylate therapy during a long stay in the hospital and who later received an unknown amount of salicylates at home while under the care of his physician, died after readmission to the hospital. A fourth patient under salicylate treatment recovered after prompt institution of corrective therapy. Observations at autopsy on the 3 patients who died are included in the present report.

In the early cases of salicylate poisoning reported in the literature the toxic condition followed ingestion of oil of wintergreen or oil of Gaultheria (the latter composed mainly of oil of wintergreen). Beck [3] briefly mentioned the case of a man who died in 1832 after drinking 1 ounce (30 cc.) of oil of wintergreen. Gallaher (1852), Jewett (1868) and Hamilton (1875) described fatalities following ingestion of similar material; their cases were summarized in 1887 by Pinkham,[4] who added 3 cases of his own. In 1943, MacCready [5] summarized the previously reported poisonings with methyl salicylate, 71 in number, and added 5 of his own, making a total of 76 cases. Townsend [6] about the same time briefly noted the death of an Indian. Barnett and his co-authors (1942) [7] described 5 cases in which poisoning followed ingestion of other salicylates, and Charters (1944) [8] reported on a patient who attempted suicide with acetylsalicylic acid.

From the Department of Pathology, University of ittsburgh, and the Children's Hospital of Pittsburgh.

Shortly after this article was submitted for publica- on a report on 2 additional cases of poisoning by alicylates appeared in The Journal of the American edical Association (Ashworth, C. T., and McKemia, F.: Hemorrhagic Complications with Death Proba- ly from Salicylate Therapy, J. A. M. A. **126**:806 Nov. 25] 1944).

1. Lawson, R. B., and Kaiser, A. D.: Methyl alicylate Poisoning: Report of a Case of Death in a hild with Rheumatic Fever Following the Cutaneous dministration of Oil of Wintergreen, Arch. Pediat. 4:509, 1937.

2. Stevenson, C. S.: Oil of Wintergreen (Methyl alicylate) Poisoning, Am. J. M. Sc. **193**:772, 1937.

3. Beck, T.: Elements of Medical Jurisprudence, Philadelphia, Thomas Coperthwait & Co., Publisher, 1838, vol. 2, p. 675.

4. Pinkham, J. G.: A Case of Poisoning with Oil of Gaultheria, Boston M. & S. J. **117**:548, 1887.

5. MacCready, R. A.: Methyl Salicylate Poisoning: Report of Five Cases, New England J. Med. **228**: 155, 1943.

6. Townsend, E.: Fatal Poisoning by Methyl Salicylate Liniment, Brit. M. J. **1**:382, 1943.

7. Barnett, H. L.; Powers, J. R.; Benward, J. H., and Hartmann, A. F.: Salicylate Intoxication in Infants and Children, J. Pediat. **21**:214, 1942.

8. Charters, A. D.: A Case of Aspirin Poisoning, Brit. M. J. **1**:10, 1944.

The pertinent data on the 4 cases which occurred in this hospital are outlined here.

REPORT OF CASES

CASE 1.—*History.*—R. D. S. was a white boy, 2 years and 3 months of age. His history was uneventful except for frequent colds. For one week before his admission to the hospital a cold had been present with no evidence of prostration. The morning before the patient's admission, at 11:30, he swallowed approximately 30 cc. of oil of wintergreen. This action was followed by burning of the mouth and copious drinking of water. He vomited for the first time four hours after ingestion of the oil. He gradually became more toxic, and about 6 o'clock the following morning the mother noted dyspnea. Dr. William H. Clark,[9] of Sheridan, Pa., was summoned. He sent the child to the hospital immediately after seeing him.

Physical Examination.—On his admission to the hospital, at 7:45 p. m. on Feb. 8, 1944, the child appeared pale, dehydrated and toxic. The pupils reacted to light, but the eyes rolled backward and appeared "starey." The alae nasi dilated with each respiration; the lips were pale and cyanotic, and the pharynx and the tonsils were injected. On examination of the chest, respirations were observed to be rapid and accompanied by pulling on the wall of the chest. Bronchial breathing was present throughout the lungs. Examination of the abdomen revealed that the liver was enlarged and extended 3 cm. below the costal margin in the right midclavicular line. Diagnoses of bronchopneumonia, hepatitis and bilateral acute catarrhal otitis media were made. Sulfadiazine was prescribed, and the child was placed in an oxygen tent. His restlessness was marked and required restraint. His respirations became irregular, and his temperature rose to 104.6 F. His pulse was rapid and irregular. Convulsive twitchings appeared on the right side, and the child died at 6:50 a. m., approximately forty-four hours after ingestion of the oil of wintergreen.

Laboratory Data.—Laboratory examinations were limited because of the short period of hospitalization. Examination of the urine revealed a faint trace of albumin and no reduction of Benedict's solution; tests for acetone and diacetic acid were not made.

Autopsy.—Autopsy was performed three hours after death.

Gross Observations: External examination revealed nothing abnormal except a sanguinopurulent discharge from both nares. The main pathologic changes noted were widespread small hemorrhagic effusions. Petechial hemorrhages were found beneath the parietal pleura throughout its extent and beneath the visceral pericardium, especially in the grooves of the coronary vessels. Confluent patches of lobular pneumonia were present in the posterior portions of both lungs. The bronchi contained some frothy sanguinous material. The liver extended 5 cm. below the xiphoid cartilage and 2.5 cm. below the right costal margin in the midclavicular line. Within the mesentery were innumerable petechial hemorrhages, which extended up to the intestine but did not involve it. Similar petechiae were found in the retroperitoneal tissues and in the perinephric and periadrenal tissues. Peyer's patches were prominent in the intestine. Congestion of the liver, the spleen and the kidneys was present.

9. Dr. Clark furnished a detailed history of this child.

Anatomic Diagnosis: The anatomic diagnosis w follows: widespread petechial hemorrhages; c tion of the lungs with early bronchopneum enlargement of the thymus; dilatation of the right s the heart; enlargement of the mediastinal, mese and retroperitoneal lymph nodes; enlargemen Peyer's patches; congestion of the viscera; fatty in tion of the liver, and parenchymatous degenerati the heart and the kidneys.

Microscopic Observations: Microscopic examin revealed widespread petechial hemorrhages throu the supporting tissue. These hemorrhages were beneath the parietal pleura and the visceral pericar In the perithymic, periaortic, periesophageal, peri and periadrenal tissues were similar hemorrh Congestion was widespread in the viscera. Parench tous degeneration of the liver, the cardiac muscle the kidneys was prominent. The liver, likewise, sh fatty infiltration and fatty degeneration. The l nodes were edematous and congested, and there hyperplasia of lymphoid tissue. The lungs showed interstitial pneumonia and congestion. Hemorrhage present in the duodenal mucosa but not elsewhere i gastrointestinal tract.

CASE 2.—*History.*—J. J. T., a 2½ year old, developed white girl, was admitted to the hospit Jan. 15, 1943. Her history contained nothing abnor On Jan. 4, 1943 the child contracted a cold. Acetyls lic acid, 5 grains (0.32 Gm.) three times a day, cathartics were prescribed by the visiting physician as no improvement was noted after three days physician was called again. Ten grains (0.65 Gm. acetylsalicylic acid every four hours was then presc for the bronchitis which had developed. On Jan 13 there was bleeding from the nose and into the m of the mouth. The following day a purpuric rash observed on the legs, the thighs and the chest, there was blood in the stools. The local physician again called; he stated that the rash was due t acetylsalicylic acid, administration of which was discontinued. The total amount of acetylsalicylic given was not definitely known, but at least 150 g (9.7 Gm.) was accounted for.

Physical Examination.—On the patient's admi to the hospital, January 15, the bleeding and the were as outlined. Nasopharyngitis and catarrhal media were present.

Laboratory Data.—The red blood cells numb 3,040,000, the white blood cells 8,200 and the plat 42,000 per cubic millimeter of blood. The blee time was ten minutes and the coagulation time s and one-half minutes. During the patient's stay in hospital bleeding occurred from the bladder as wel from the other two sites.

Course in the Hospital.—On January 16 the gave a gasp and became limp, but prompt resuscita restored her breathing. After a transfusion of pla was given and oxygen was administered, she bec alert and active. Several hours later convulsions be and signs of asymmetry of the pupils appeared. C ensued, and the child died on January 16, at 9:25 p

Autopsy.—Gross Observations: At autopsy, tw hours after death, examination revealed crusts of b about the nares and lips. The skin of the entire b was covered with petechial hemorrhages, varying size, color and nodularity. When the head was ope petechial hemorrhages were seen beneath the s A large hemorrhage was found in the leptomeni extending into the substance of the frontal lobe of

hemisphere. There was also hemorrhage into the lateral ventricle, the posterior horn of the left l ventricle, the third ventricle and the leptoges around the medulla and the spinal medulla. the chest was opened petechial hemorrhages were beneath the visceral pericardium, in the musculaf the right auricle and in the left side of the heart. hial hemorrhages and patchy bronchopneumonia present in the left lung to a moderate extent and he right lung to a marked extent. Massive rrhage extended from the upper pole of the right y down through the retroperitoneal space to the of the pelvis. These hemorrhages were caused by re of an anomalous renal artery, which arose from varian artery. The hemorrhage had dissected its down along the ureter and into the renal pelvis. spleen at one end contained a small recent infarct. l petechial hemorrhages dotted the congested sa of the stomach, the jejunum and the colon.

atomic Diagnosis: The anatomic diagnosis was as ws: Thrombopenic purpura (postsalicylate); cere- hemorrhage (frontal lobe of right hemisphere); ngeal hemorrhage around the medulla; enlarged us; bronchopneumonia; hemorrhage of both lungs; hial hemorrhage into the myocardium; petechial rrhage of the stomach and the large intestine, and ive hemorrhage of the left renal pelvis and of the enal space around the left ureter.

croscopic Observations: Microscopic examination he brain showed edema and hemorrhages. The extended from the space of His into the substance he cortex. The heart showed small petechial rrhages into the myocardium, the subendocardium the subepicardium. Bronchitis, bronchopneumonia petechial hemorrhages were present in the lungs. wise, the lymph nodes contained petechial hemores and acute inflammatory exudate. Two small s of hemorrhage were present in the spleen, which the site of acute splenitis. The stomach and the contained hemorrhages into the superficial mucosa. acute hepatitis, toxic hepatitis and pericholangitis present in the liver.

ASE 3.—*History.*—J. C. H., an 11 year old white boy, admitted to the hospital on Jan. 28, 1944. He had mumps at 4 years, measles, German measles and oping cough at 5 years and a fractured forearm at ars. Two weeks before his admission to the hos-, when he was recovering from pneumonia, ching of the hands, the arms, the head and the legs loped, gradually increasing in severity. The day re his admission he became aphasic.

hysical Examination on First Admission to the Hos-.—On his admission he did not appear ill but was wsy, and choreiform movements were present. The rynx and the tonsils were injected, and cervical phadenopathy was extreme. A soft systolic murmur, well transmitted, was present at the apex. Kernig's was positive bilaterally, and ataxia was marked. temperature was 100 F., his pulse was normal and respiratory rate was 24 per minute.

aboratory Data.—Laboratory examination revealed Gm. of hemoglobin per hundred cubic centimeters lood, 3,900,000 red cells per cubic millimeter of blood 16,200 white cells per cubic millimeter, with 80 per neutrophils. The urine showed a faint trace of min and an occasional erythrocyte and neutrophil. sedimentation rate was 34 mm. in sixty minutes. mination of the spinal fluid and a Wassermann test aled no abnormalities. The diagnosis on the patient's admission was Sydenham's chorea and associated pharyngitis, laryngitis and tonsilitis.

Course in the Hospital.—On study of the patient in the hospital a diagnosis of active rheumatic fever with cardiac involvement was made. On February 15 a culture of the blood, made because of elevation of temperature, failed to demonstrate the presence of any organisms. Therapy with sulfonamide compounds and salicylates was instituted, but the rheumatic fever remained active. Twitchings were controlled by sedation. Therapy with sulfonamide compounds was discontinued on February 22 for a week, started again on February 29 and maintained until March 13. The child became emaciated, anorexic and dysphagic. Administration of salicylates was discontinued on March 6. Throughout March the patient was acutely ill and had what is best described as a "beaten" attitude. Decubitus ulcers had developed in the meantime.

In May and in June the patient had febrile episodes, ascribed to infections of the respiratory tract. Therapy with sulfonamide compounds was again instituted on May 2 for a week. The sedimentation rate remained elevated. Sulfonamide compounds were again given from June 25 to June 29. The patient was permitted to go home on July 10, although his discharge record shows a diagnosis of chorea and rheumatic heart disease with aortic insufficiency and mitral disease. During this stay of five and one-half months in the hospital 1,020 grains (61.2 Gm.) of sodium salicylate was given between February 14 and March 6.

The amounts of sulfonamide compounds given were as follows: sulfamerazine, 172.5 grains (10.35 Gm.) from February 13 to February 22, and sulfadiazine, 476.2 grains (28.57 Gm.) from February 29 to March 13, 224 grains (13.44 Gm.) from May 2 to May 9 and 154.4 grains (9.26 Gm.) from June 25 to June 29.

Second Admission to the Hospital.—On September 9 the child was admitted to the hospital a second time. All that is known of the salicylate therapy between the first and second admissions to the hospital is that the child received 5 grains (0.3 Gm.) of acetylsalicylic acid three times a day for ten days before the second admission.

For two weeks before this admission he had gradually increased dyspnea and edema of the ankles, which suddenly became severe on September 8.

He was cyanotic and dyspneic and had severe edema of the lower extremities. Examination revealed cardiac enlargement, mitral and aortic diastolic murmurs, a regular heart rate and pulmonary edema. The liver was enlarged, and the vascular phenomena characteristic of aortic insufficiency were present. A pericardial tap elicited a few cubic centimeters of bloody fluid. The child died thirteen and one-half hours after admission. The final clinical diagnosis was rheumatic heart disease grade 4E, congestive failure, cardiac enlargement, mitral and aortic insufficiency, sinus tachycardia and pericarditis.

Autopsy.—Autopsy was performed five hours after death.

Gross Observations: External examination revealed edema of both lower extremities and decubitus ulcers over both femoral heads. The fat and muscle beneath the skin along the line of the initial incision were the site of extensive hemorrhage. There were two main categories of pathologic changes. The most striking alterations were the innumerable hemorrhages throughout the serous membranes, ranging from petechiae of minute size to large hematomas. These were present

in the parietal pleura, the pericardium, the mesentery, the omentum, the retroperitoneal area and the supportive tissues around the pancreas, the adrenal glands, the kidneys and the aorta. The changes of the second category were those in the heart. Adhesive pericarditis was present over the left ventricle. The right auricle and the mitral and aortic valves showed verrucous vegetations. Chronic passive congestion of the viscera, especially the liver and the lungs, was extreme.

Anatomic Diagnosis: The anatomic diagnosis was as follows: widespread petechial hemorrhages; pericarditis with effusion; rheumatic mycorditis; ball thrombus in the right auricle; mitral endocarditis; aortic endocarditis; bilateral fibrous pleurisy; bilateral bronchopneumonia; chronic passive congestion of the lungs, the liver and the spleen; fatty infiltration of the liver; massive bilateral perirenal hemorrhage; massive hemorrhage of the right periadrenal area, and acute lymphadenitis.

Microscopic Changes: On microscopic examination, hemorrhages of varying sizes were found in the supporting tissue of all the viscera. In the periadrenal and perinephric areas the hemorrhages were massive. Congestion of all the viscera was extreme. Parenchymatous degeneration of the liver, the kidneys, the adrenal cortex and the medulla and fatty degeneration of the liver and the kidneys were present. The lesions in the heart were typical of an acute rheumatic infection, with Aschoff nodules in the myocardium and acute endocarditis. In a few areas of the myocardium, where, because of acute rheumatic involvement, the cardiac muscle had disappeared, the capillaries remained in a telangiectatic bed. There was considerable hemorrhage throughout this vascular network. The extravasation of red cells ranged from diapedesis of a few cells to moderate amounts of extruded blood. The lymphoid tissue showed evidence of hyperplasia.

CASE 4.—*History.*—A. S. C., a white boy of 7½ years, was admitted to the hospital July 11, 1944, with a history of frequent colds, tonsillitis and otitis media at 1 year of age. There was also a history of measles, whooping cough, chickenpox and mumps. For one week before his admission he had swelling and tenderness of the right ankle.

Physical Examination.—On his admission the cervical lymph nodes and the tonsils were enlarged and injected. No enlargement of the heart was present, but a loud systolic murmur was heard over the precordium. The right ankle and foot were swollen, pale and hot to palpation. Tenderness of the ankle joint was marked. A diagnosis of rheumatic heart disease was made.

Treatment and Course.—Methyl salicylate was immediately applied to the right ankle; beginning the following day, sodium salicylate (enteric-coated), 15 grains (0.9 Gm.), was administered four times a day by mouth. The salicylates were vomited, and three days after the patient's admission oral administration of salicylates was stopped and replaced by rectal administration of 80 grains (4.8 Gm.) of sodium salicylate per day. On July 23 the child began to have abdominal pain, nausea and vomiting. He became excited and uncooperative, screaming continuously for long periods. The symptoms continued, and on July 24 nosebleed occurred. These outbursts of excitement led to discontinuance of the salicylate therapy. On July 26 he seemed lethargic and reacted poorly; his skin was hot and dry. His blood sugar on this day was read as 156 mg. per hundred cubic centimeters. Fluids were administered by all routes. Forty hours after cessation of therapy the blood sugar had dropped to 87 mg. [illegible] hundred cubic centimeters and the carbon dioxide-co[illegible] bining power of the blood was 40 volumes per c[illegible] The patient's condition gradually improved, and he [illegible] discharged on August 5 and sent home for convale[illegible] cence. No further evidence of toxicity was report[illegible] The total amount of salicylates administered in [illegible] hospital was 270 grains (16.2 Gm.) of sodium salicyl[illegible] by mouth and 720 grains (43.2 Gm.) of the same d[illegible] by bowel.

TOXICITY OF SALICYLATES

Although the toxicity of the salicylates h[illegible] been definitely established, the mechanism [illegible] which the injury is produced is still a baffli[illegible] problem. The clinical picture of salicylate poiso[illegible] ing is characterized by extreme dyspnea; irri[illegible] bility and restlessness; nausea and vomiti[illegible] dehydration, and eventually disorientation, pa[illegible] lysis in some cases, coma and death. Acidosis [illegible] present, often to a considerable degree. To e[illegible] plain the sequence of these symptoms, four m[illegible] theories have been offered but without convi[illegible] ing proof for any of them.

According to one group of writers, Quinc[illegible] (1882),[10] Johnson (1930),[11] Bowen, Roufa a[illegible] Clinger (1936)[12] and Williams and Panti[illegible] (1937),[13] acidosis leading to hyperpnea is t[illegible] main underlying factor, but these authors offer[illegible] little direct evidence for the validity of the theor[illegible]

The second theory postulates direct stimulati[illegible] of the respiratory center which leads to hype[illegible] pnea and ends in acidosis. To this school [illegible] thought belonged Odin (1932),[14] Linds[illegible] (1937),[15] Shireff and Pearlman (1940),[16] Ba[illegible] nett et al. (1942) [7] and many of the German a[illegible] the Scandinavian workers. Silverman a[illegible] Piccolo (1942) [17] suggested that the damage [illegible] primarily to the hypothalamic nuclei. Barn[illegible] and his co-workers,[7] studying the acidosis a[illegible] ketosis in 5 intoxicated children, expressed t[illegible] view that the ketosis is more intense and pe[illegible] sistent than can be satisfactorily accounted for b[illegible] vomiting of brief duration. They suggested th[illegible] possibility that susceptibility to salicylate poiso[illegible]

10. Quincke, H.: Zur Kenntniss der Salicylsaurewi[illegible] kung, Berl. klin. Wchnschr. **19**:709, 1882.

11. Johnson, C. C.: The Salicylates: XIX. The Qu[illegible] tion of Acidosis Following the Administration [illegible] Salicylates, J. A. M. A. **94**:784 (March 15) 193[illegible]

12. Bowen, B. D.; Roufa, J. F., and Clinger, O. W[illegible] The Differential Diagnosis of Salicylate Poisoning a[illegible] Diabetic Acidosis, J. A. M. A. **107**:276 (July 25) 19[illegible]

13. Williams, S. W., and Panting, R. M.: Treatme[illegible] of Aspirin Poisoning by Intravenous Sodium Lacta[illegible] Solution, Brit. M. J. **1**:550, 1937.

14. Odin, M.: Is Salicyl Poisoning an "Acidosis"[illegible] Acta med. Scandinav. (supp.) **50**:177, 1932.

15. Lindsay, L. M.: Acute Salicylate Poisoning, A[illegible] J. Dis. Child. **54**:952 (Oct.) 1937.

16. Shireff, W. T., and Pearlman, L. N.: Oil [illegible] Wintergreen Poisoning, Canad. M. A. J. **43**:264, 19[illegible]

17. Silverman, I., and Piccolo, P. A.: Oil of Wint[illegible] green Poisoning, Bull. New England M. Center **4**:1[illegible] 1942.

may depend on inadequate glycogen reserves the body at the time the salicylates are administered. According to these authors the underng mechanism of salicylate toxicity involves marily hyperventilation, which causes inased basal metabolic rate, and this in turn pletes the glycogen reserves. It is of interest this connection that Lutwak-Mann [18] noted appearance of nearly all the hepatic glycogen rtly after injection of salicylates into the perimental animal, which would indicate a ect rather than an indirect depletion of tissue cogen. Her demonstration of interference by icylates with activity of the enzyme may inate an approach to a rational explanation of a chanism by which drugs initiate damage to tissues.

The third group, represented by Dodd, Mi- and Arena (1937),[19] were proponents of theory that an increase in the basal metabolic e is the fundamental phenomenon in intoxiion by salicylates. Barbour and Devenis [20] Barbour [21] found that acetylsalicylic acid proced a definite increase in excretion of carbon oxide and production of heat in normal perns but not in febrile patients. Elimination of t was increased in febrile patients but not in rmal persons. However, Denis and Means [22] served that large doses of salicylates were not ariably followed by an increase in the basal tabolic rate.

The fourth group stressed changes in blood. e prolongation in prothrombin time is the imtant factor, according to Honigsberger 943),[23] Hurst (1943),[24] Shapiro, Redish and mpbell (1943) [25] and Meyer and Howard (1943).[26] Lathrop [27] expressed the opinion that toxic injury to the small blood vessels is the primary lesion. He further expressed the view that dyspnea due to direct action on the medulla precedes and initiates the hyperpnea. Lindsay (1937) [15] stated that the hemorrhages which occur are due to general vascular damage. In substantiation of the latter interpretation are observations made on tissues in case 2 of our series, showing that the hemorrhage began with a direct diapedesis of the red blood cells through a more permeable capillary wall. This was seen in many organs but was particularly well demonstrated in the capillaries of the brain, where the train of events, beginning with diapedesis through the capillary endothelium and ending with fairly extensive hemorrhage into the space of His, could be followed. This observation would seem to indicate that the salicylates definitely damage tissues and that in the course of this damage to tissues increased permeability of vessels occurs early.

This change in vascular endothelium supports Hanzlik and Wetzel's [28] and Hanzlik's [29] observations on the parallelism between retention in the tissue and increased toxicity of the methyl salicylate. The decrease in tolerance of certain allergic persons for salicylates is possibly explicable on a vascular basis. The largest group showing an immediate allergic reaction are patients with asthma and nasal polyps.[30]

In the children seen at this hospital central stimulation would seem to be the initial reaction, because hyperpnea is the first outstanding symptom. This is followed by increased production of heat and by acidosis. The hyperpnea offers ready explanation for the inception of increased metabolism and hence an enhanced basal metabolic rate. We are of the opinion that the salicylate acts directly on tissue and especially on endothelium, increasing its permeability and allowing readier diffusion of the drug.

PATHOLOGIC CHANGES IN SALICYLATE POISONING

The pathologic changes occurring in salicylate poisoning are clearcut and although extensive

18. Lutwak-Mann, C.: The Effect of Salicylates and chophen on Enzymes and Metabolic Processes, chem. J. **36**:706, 1942.

19. Dodd, K.; Minot, A. S., and Arena, J. M.: icylate Poisoning: An Explanation of the More ious Manifestations, Am. J. Dis. Child. **53**:1435 ne) 1937.

20. Barbour, H. G., and Devenis, N. M.: Acetyl icylic Acid and Heat Regulation in Normal Indiuals, J. Pharmacol. & Exper. Therap. **13**:499, 1919.

21. Barbour, H. G.: Acetyl Salicylic Acid and Heat gulation in Febrile Cases, J. Pharmacol. & Exper. erap. **13**:500, 1919.

22. Denis, W., and Means, J. H.: The Influences of icylate on Metabolism in Man, J. Pharmacol. & per. Therap. **8**:273, 1916.

23. Honigsberger, M.: Aspirin and Gastric Hemorge, Brit. M. J. **2**:57, 1943.

24. Hurst, A.: Aspirin and Gastric Hemorrhage, it. M. J. **1**:786, 1943.

25. Shapiro, S.; Redish, M. H., and Campbell, H. A.: dies on Prothrombin: IV. The Prothrombinopenic ect of Salicylate in Man, Proc. Soc. Exper. Biol. & d. **53**:251, 1943.

26. Meyer, O. O., and Howard, B.: Production of poprothrombinemia and Hypocoagulability of the od with Salicylates, Proc. Soc. Exper. Biol. & Med. 234, 1943.

27. Lathrop, F. W.: Fatal Poisoning with Oil of Wintergreen, J. M. Soc. New Jersey **29**:303, 1932.

28. Hanzlik, P. J., and Wetzel, N. C.: 12. The Excretion of Salicyl After the Administration of Methyl Salicylate to Animals. J. Pharmacol. & Exper. Therap. **14**:43, 1920.

29. Hanzlik, P. J.: Actions and Use of Salicylates and Cinchophen in Medicine, Medicine **5**:197, 1926.

30. Buchstein, H. F., and Prickman, L. E.: Allergic Reactions from Acetylsalicylic Acid (Aspirin), Proc. Staff Meet., Mayo Clin. **12**:616, 1937. Prickman, L. E., and Buchstein, H. F.: Hypersensitivity to Acetylsalicylic Acid (Aspirin), J. A. M. A. **108**:445 (Feb. 6) 1937.

can be briefly described. Outstanding and dramatic were the generalized petechial hemorrhages, varying in size from shots no larger than pinpoints to large hematomas, which were seen throughout the supportive tissue in our patients at autopsy. This finding is in accord with previous pathologic reports. Hemorrhages have been found constantly in the pleura, the pericardium, the omentum, the mesentery, the galea, the meninges and the spaces of His and Virchow-Robin. Congestion has been generally found in the organs, and some authors have recorded hemorrhage in the brain, the lungs, the myocardium and the mucosa of the stomach. The minor pathologic changes are cloudy swelling and fatty degeneration of the kidneys and the liver. The latter lesions may be due to direct damage of these organs by salicylates.

The constant character of the changes noted at autopsy has been noted by Lathrop,[27] who emphasized the petechial hemorrhages in the serous membranes, the general congestion of the organs, the degeneration of the renal tubules and the subdural hemorrhages; the last of these conditions he found in 50 per cent of the cases. Stevenson [2] reviewed the reports of autopsies up to 1937 and again asserted that the pathologic changes are primarily vascular, with secondary degenerative changes in the parenchymatous organs.

THERAPY

It is agreed by all who have investigated treatment of salicylate intoxication that hydration constitutes an important part of the therapy. The beneficial effect of hydration was demonstrated experimentally by Dodd and associates [19] in dogs. With free access to water and with increased respiration the animals recovered, while anesthetized animals, unable to hydrate themselves, showed a clinical picture similar to that of patients with intoxication. Patient A. S. C. (case 4) recovered rapidly without other treatment than withdrawal of the drug and prompt institution of hydration. One obvious effect of hydration is dilution and washing out of the salicylate retained in the tissue.

In those cases in which single large doses have been ingested either accidentally or for suicidal purposes, gastric lavage is indicated if the patient is seen early. When there has been no treatment until hyperpnea ensues, absorption has probably progressed to a point which makes lavage useless.

Barnett and his co-workers [7] advocated the use of adequate amounts of alkali; they recommended sodium r-lactate as the safest and most efficacious choice, because in their opinion it can be most readily metabolized in the presence of salicylate intoxication. Williams and Panting [13] concur with Barnett and his associates on this mode therapy. They stressed the point that sodi bicarbonate should not be used for gastric lava since it may increase the absorption of the sali late in the early stages of acute poisoning. O sted and Aldrich [31] gave sodium bicarbonate mouth or, to patients late in stages of poisoni by rectum. Barbour and Porter,[32] investigati the action of calcium given either as glucon or in other forms on the toxic effects of la doses of acetylsalicylic acid, came to the c clusion that calcium has no effect on the toxi of the salicylate.

Barnett and his group [7] stressed, in addition treatment of the intoxication with sodi r-lactate, administration of large amounts of d trose to persons under prolonged salicyl therapy. They postulated that "susceptibili may lie in low storage of glycogen when thera is started. Dextrose has likewise been advis by Bowen, Roufa and Clinger,[12] by Charter and by Dodd and his co-workers.[19] The use cooling sponges has been suggested by the lat group as a treatment for the high temperature.

It has been found experimentally that the p thrombinopenic effects of salicylates can avoided if vitamin K is given concomitant The suggestion has been made that large doses salicylates be administered only when acco panied by vitamin K.[33] Shireff and Pearlman recommended administration of morphine necessary to combat hyperpnea and suggest digitalization for any heart failure.

Hydration plus treatment for the vari symptoms which present themselves seems to the early treatment of choice. Withdrawal of t drug when the first signs of intoxication appe is important. Because in the 1 case in the pre ent series in which the condition was correct diagnosed it yielded dramatically to withdraw of the drug and hydration with administration dextrose, alkali has not been used in this hospit

COMMENT

One of the interesting but unexplained o servations in the general pathologic picture

31. Olmsted, J. G. M., and Aldrich, C. A.: Acidosis Methyl Salicylate Poisoning: Report of Two Cases a a Review of the Literature, J. A. M. A. **90**:1438 (M 5) 1928.

32. Barbour, H. G., and Porter, J. A.: An Investig tion of the Possible Protective Action of Calci Gluconate in Aspirin Poisoning, J. Pharmacol. & Exp Therap. **60**:224, 1937.

33. Is Aspirin a Dangerous Drug? editori J. A. M. A. **124**:777 (March 18) 1944.

icylate poisoning is the comparative limitation the hemorrhagic manifestations to supportive sue. In our patient J. C. H. the extensive morrhages in the pericardium were in marked ntrast to their absence, or presence only in a w scattered areas, in the myocardium. De- ite the fact that widespread damage was pres- t in the myocardium, it was only in those areas which destruction and loss of myocardium d left the coronary capillaries free from sup- rting cardiac cells that hemorrhage had oc- rred. It is significant that in the serous mem- anes, where hemorrhage is most prominent, is in the small capillaries, whose wall is limited endothelium, that hemorrhage occurs. It uld appear that in the larger vessels the supporting muscular wall of the arteries may form a bulwark against the escape of blood through damaged endothelium.

SUMMARY

Of 4 cases of salicylate intoxication, 3 proved fatal. One patient recovered after prompt discontinuance of administration of the drug and institution of hydration. The different compounds implicated in the 4 cases were: (1) oil of wintergreen; (2) acetylsalicylic acid; (3) methyl salicylate (applied by inunction), sodium salicylate and acetylsalicylic acid, and (4) sodium salicylate. The main pathologic change noted was widespread hemorrhage from capillaries in the serous surfaces and supportive tissues.

News and Comment

GENERAL NEWS

Tribute to Archivos latino-americanos de pediatría on Fortieth Anniversary of Its Founding.—The following letter is self explanatory. There is no question that the *Archivos latino-americanos de pediatría* was the first pediatric journal in South America of any value. This journal existed for some twenty-five years and represented the pediatrics of South America in an admirable way. The founders are to be congratulated on the impetus which they gave to pediatrics in Latin-American countries, and the AMERICAN JOURNAL OF DISEASES OF CHILDREN joins with the Uruguayan group in offering homage to these men.

Montevideo, Uruguay,
Nov. 10, 1944

Dr. Clifford G. Grulee, Director
American Journal of Diseases of Children
Evanston, Ill., U. S. A.

Dear Sir:

In March 1945, forty years will have passed since the founding of *Archivos Latino-Americanos de Pedatría,* pediatric journal founded in 1905 by Luis Morquio, Gregorio Aráoz Alfaro, Fernandes Figueira and Olinto de Oliveira and published in Buenos Aires, Argentina, from 1905 to 1929.

The appearance of this periodical, the first international one on pediatrics in Latin America, marks an epoch, since from that time the problem of the child has taken shape in these countries. In recognition of this fact a group of Uruguayan doctors, representing pediatrics and child care, has organized an executive committee in order to commemorate this fortunate occurrence.

Two of the illustrious founders have died, the eminent professors Morquio and Fernandes Figueira, but happily Aráoz Alfaro in Buenos Aires and Olinto de Oliveira in Rio de Janeiro are still at the height of their intellectual activities; therefore, this committee believes homage ought to be paid by pediatricians in America to their four illustrious colleagues.

With this object we ask your endorsement and beg that you publish this note and the information which refers to the tribute. We take advantage of the opportunity to greet you with the greatest esteem.

Roberto Berro,
President

Víctor Escardó y Anaya,
Secretary

Executive Committee:

Dr. Roberto Berro,
President

Dr. Víctor Escardó y Anaya,
Secretary

Other officers:

Drs. Scosería, Bauza, Bonaba,
Pelfort, Piaggio Garzón, Pra

Office: Avenida 18 de julio 1648, P. 3.

A Large New Child Care Foundation.—authorities of the state of New York have permitted filing of the certificate of incorporation of a new nat organization for child care which, under the Foundation for Child Care and Nervous Child H Inc., will start its activity with the beginning of

Among the plans the new foundation intends to c out is the establishment of a school in the city of York for several hundred mentally subnormal chil a national institution for prepsychotic and predelinq children, a school for social workers and nurse mentally subnormal children, regular courses and fo for parents' and teachers' instruction and finally serial publications, one devoted to the problems of of mentally abnormal children and the other to education on similar subjects.

Among the Foundation's Directors are: Dr. H Bakwin, New York University Medical College; Violet de Laszlo, of New York; Dr. J. Louise Des of Cornell Medical College; Dr. George Henry Cornell Medical College; Dr. Ernest Harms, editi the journal *The Nervous Child;* Dr. Leo Kanne Johns Hopkins University Medical School, and Ju Jacob Panken, of New York. Dr. Leo Kanner serve as president and Dr. Harms as executive dir for the first period; Helen L. Buttenwieser is the c selor for the foundation.

Abstracts from Current Literature

Metabolism; Infant Feeding; Milk and Other Foods

SMA VOLUME OF DOGS IN DEHYDRATION, WITH AND WITHOUT SALT LOSS. JAMES HOPPER JR., J. RUSSELL ELKINTON and ALEXANDER W. WINKLER, J. Clin. Investigation **23**:111 (Jan.) 1944.

dogs subjected to dehydration by experimental edures leading to reduction in body water with and out loss of salt, it was found that the changes in ma volume paralleled those in extracellular fluid me only under certain limited conditions. With le deprivation of food and water volumes of both cellular and extracellular phases diminished to t the same degree, total ionic concentration in the fluids rose to above normal and there was little rent impairment of circulation. With depletion of and water (by intraperitoneal injection of dextrose ion and subsequent withdrawal of peritoneal fluid) of water was mainly extracellular, and total ionic entration of the body fluids fell. Depletion of extra- lar salt and water resulted in a more severe circu- y embarrassment than could be attributed to the raction in extracellular fluid alone.

GUEST, Cincinnati.

MAN RESPIRATORY QUOTIENTS IN RELATION TO ALVEOLAR CARBON DIOXIDE AND BLOOD LACTIC ACID AFTER INGESTION OF GLUCOSE, FRUCTOSE OR GALACTOSE. HAROLD T. EDWARDS, EDWARD H. BENSLEY, DAVID B. DILL and THORNE M. CARPENTER, J. Nutrition **27**:241 (March) 1944.

Harold T. Edwards and others studied the effects of ingestion of 50, 75 or 100 Gm. of dextrose, fructose galactose respectively on the alveolar carbon ide, the blood lactic acid, and the respiratory quo- of 2 normal men over a four hour period. In the ctose experiments there was a decrease in the alveo- carbon dioxide. Fructose increased the amount of d lactic acid most and for the longest period of ; however, all three sugars increased the amount lood lactic acid. The greatest net increases in the iratory quotient were produced by the ingestion of tose. The maximum net increase in respiratory ient after dextrose was taken occurred within ninety ne hundred and thirty-five minutes, and the pre- stion level did not return within the four hours. differences in the rises in respiratory quotient indi- differences in the rapidity of combustion of the r or differences in the rate at which sugars are sformed into fat.

FREDEEN, Kansas City, Mo.

ED FOOD FOR CHILDREN? FRANK HOWARD RICHARDSON, J. Pediat. **24**:199 (Feb.) 1944.

he author had always believed the generally accepted um that fried foods are harmful for children and ld be forbidden, thinking it rested on sound scien- grounds. Yet he knew that he and most of the ors he knew not only ate fried foods and let their children eat them but actually prescribed scrambled , chops and bacon, all of which are usually fried.

He determined to find out how sound the reasons for this belief were. For this purpose he made a study of the literature of scientific research, current published opinion, as recorded in books and in health bulletins and pamphlets, popular beliefs of the laity and of the medical profession and the opinions of leading nutritionists and pediatricians, expressed in personal correspondence, regarding the harmfulness or harmlessness of fried foods for children.

As the opinions of the nutritionists and pediatricians differed from what the author had expected and were at variance with the generally expressed belief, it seemed to him worth while to list connections of the authorities consulted. Eleven were nutritionists, biochemists and physiologists who were heads of departments in leading, approved institutions of learning, mainly universities and medical schools; seven were nationally recognized pediatricians with private practices as well as teaching positions, welfare appointments and hospital connections, and (2) were pediatricians holding key positions in the federal Children's Bureau; the remainder of the group was composed of 2 gastroenterologists in private practice, 1 director of nutrition in the American Red Cross, 2 editors of medical publications and 2 directors of research bureaus.

The conclusions derived from information obtained from the sources cited are as follows:

1. There is a widely held belief, both lay and medical, that fried foods are particularly harmful for children.

2. Current textbooks and pamphlets on health, while seeming to give scientific support to this belief, are actually reiterating without the slightest documentation, an old unscientific prejudice.

3. Many of the statements condemning frying indicate that improper technic in frying has given rise to the sweeping but unjust condemnation of *all* fried foods.

4. In opposition to these unfounded prejudices, it was the overwhelmingly held opinion of the nutritionists, biochemists, physiologists and pediatricians consulted that there is nothing harmful in properly fried foods for children.

5. The opinion that fried food is harmless was borne out by the only piece of experimental work discovered in the literature.

RICHARDSON, Black Mountain, N. C.

STUDIES OF AMINO ACID ADMINISTRATION. ALEXIS F. HARTMANN, HARRY J. LAWLER and CORNELIUS S. MEEKER, J. Pediat. **24**:371 (April) 1944.

Clinical study of an enzymatic digest of casein (amigen, p_H 6.5) during a period of three years, involving its administration to more than 300 children who were unable to derive adequate nutrition from natural foods taken by mouth, is summarized and discussed. Eight cases are presented in some detail, showing how the use of the casein digest orally and parenterally was integrated with the balance of the therapeutic regimen in the treatment of dysentery, diarrhea in a premature infant, gangrenous intussusception, pyloric stenosis, peritonitis, pneumonia with cardiac decompensation, tetanus and diarrhea associated with chronic glomerulonephritis.

Intravenous administration of 10 per cent amigen mixed with 10 per cent solution of dextrose and/or isotonic solution of three chlorides U. S. P. in various concentrations was found to be a good method. In older children when the rate of flow per kilogram per minute was 0.01 Gm. of amigen or more flushing of the face and a feeling of warmth occurred.

Solutions as concentrated as 5 per cent amigen and 5 per cent dextrose given subcutaneously were well tolerated; a useful solution was prepared by mixing equal parts of 10 per cent amigen, 10 per cent dextrose and isotonic solution of three chlorides or lactate-Ringer solution. Absorption by this route was slow, approximating the time required for a meal to be absorbed from the intestine. Subcutaneous use of these crystalloid solutions for patients with untreated severe dehydration is contraindicated; the solutions tend to remain locally and further dehydrate the body.

Intraperitoneal administration is possible; absorption of amino acids administered by this route is apparently rapid.

When the solution of amino acids is used in conjunction with dextrose and vitamins, it probably makes possible complete parenteral feeding for relatively long periods. A 6 year old child was fed thus for two weeks.

Oral administration of a mixture of 10 per cent amigen, 10 per cent dextrose and a solution of 1 per cent lactic acid and 0.5 per cent sodium lactate was found to be of particular value in the treatment of diarrhea, dysentery, peritonitis and intestinal irritation from other causes and after intestinal operations. It was frequently well tolerated when dilute acidified evaporated milk produced exacerbation of symptoms.

HARTMANN, St. Louis.

HYPOPROTEINEMIA IN CHRONIC NUTRITIVE DISTURBANCES OF THE INFANT. MARIO J. DEL CARRIL, ALFREDO LARGUIA, MARCELO GORI and JUAN DUILIO VIDAL, Arch. argent. de pediat. **21**:210 (March) 1944.

The total plasma proteins were determined in 33 infants showing advanced chronic nutritive disturbances. Hypoproteinemia was found in 78.7 per cent of the cases. The same low plasma protein level is found in dystrophic infants during an acute episode of dehydration.

The causes and pathogenesis of the hypoproteinemia are analyzed. Its relationship to malnutrition is also studied. Finally, the new therapeutic trends are stressed, and the use of plasma transfusions and of amino acids is advocated.

CASSORLA, San Francisco.

Vitamins; Avitaminoses

SOME OBSERVATIONS OF DARK ADAPTATION IN MAN AND THEIR BEARING ON THE PROBLEM OF HUMAN REQUIREMENT FOR VITAMIN A. E. L. BATCHELDER and JANE C. EBBS, J. Nutrition **27**:295 (April) 1944.

The variation in the rate of depletion of different subjects may be partly due to individual differences in physiologic response to vitamin A deficiency; some subjects, such as the one described by E. L. Batchelder and Jane C. Ebbs and a few others reported in the literature, failed to show a decrease in dark adaptation after many months on a vitamin A–deficient diet. This circumstance could probably be explained on the ground of unusually large body stores of the vitamin or more economical use of the body stores. The rhodometer was used to measure the dark adaptation of 4 young adults fed a vitamin A–deficient diet. In 3 subjects, 74 U. S. P. units of vitamin A per kilogram of body weight (5 units per day) sufficed only to maintain a threshold log units above normal; 84 units per kilogram (4 per day) maintained a threshold 0.5–log units a normal, and 81 units per kilogram (5,000 units per maintained an approximately normal threshold.

FREDEEN, Kansas City, M

A STUDY OF NEUROMUSCULAR REGENERATION U DIFFERENT LEVELS OF VITAMIN C INTAKE. H HINES, B. LAZERE, J. D. THOMSON and C CRETZMEYER, J. Nutrition **27**:303 (April) 1944.

H. M. Hines and others made a comparative s of neuromuscular regeneration in guinea pigs subsis on different levels of vitamin C, 0.5 to 50 mg. per The regenerating muscles of animals subsisting on optimal intakes of ascorbic acid were relatively we than those of animals with adequate intakes. The tarded functional recovery in such muscles may be to a lack of sufficient collagenous material for regen tion and protection against hemorrhagic lesions cipitated by stress, strain and trauma. It is also gested that regenerating muscles may have a hi vitamin C requirement than nonregenerating co muscles. There was no beneficial effect with exce intakes of vitamin C.

FREDEEN, Kansas City, M

RESPONSE TO THE INTRAVENOUS INJECTION OF ASC ACID AS INDICATED BY THE URINARY EXCRETIO THE TOTAL AND REDUCED FORMS. GEORGE H. B MAN, CYRUS E. FRENCH, HAROLD A. HARPER HERBERT POLLACK, J. Nutrition **27**:309 (April)

George H. Berryman and others determined urinary excretion of reduced and of total ascorbic by 68 soldiers during a six hour period after intrave injection of 200 mg. of ascorbic acid. In spite fairly equal and constant intake of ascorbic acid a variation was noted among individuals in their resp to the load test, as was apparent after the estim of both reduced and total ascorbic acid excretions very high correlation between the two methods indic a regular association of high reduced ascorbic acid cretion with high total ascorbic acid excretion. amount of dehydroascorbic acid was computed by ference. The means of the amounts of total asc acid excretion and of reduced ascorbic acid excr were 29.4 and 24.2 respectively. The difference bet the means of the two methods was interpreted as i cating the presence of a small quantity of dehy ascorbic acid in the urine.

FREDEEN, Kansas City, M

THE B VITAMIN CONTENT OF GROATS AND RO OATS. JACK M. COOPERMAN and C. A. ELVEH J. Nutrition **27**:329 (April) 1944.

Cooperman and Elvehjem present the thiamine, tinic acid, pantothenic acid, riboflavine and pyrido content of about 30 samples of commercial oat gr and rolled oats and of experimentally hand-hulled

FREDEEN, Kansas City, M

STUDIES OF THE URINARY EXCRETION OF RIBOFLA VIRGINIA H. FEDER, GEORGE T. LEWIS and HER S. ALDEN, J. Nutrition **27**:347 (April) 1944.

Virginia H. Feder and others determined the r flavin content of 658 specimens of urine. They fo that the amount of riboflavin per cubic centimeter

is a more constant value than other values which been used to express excretion of riboflavin. They conclude that the analysis of a fasting morning men is as conclusive as saturation tests. Their y shows a widespread incidence of riboflavin iency.

FREDEEN, Kansas City, Mo.

EFFECT OF VITAMIN D FROM COD-LIVER OIL AND TUNA-LIVER OIL UPON SERUM PHOSPHATASE CONCENTRATIONS IN RACHITIC INFANTS. DONALD BARNES, BERTHA MUNKS and MILDRED KAUCHER, Pediat. **24**:159 (Feb.) 1944.

uring a period of six weeks 48 Negro and white its 1 to 18 months old, all of whom had high con- of phosphatase in the serum, were given 600, 900 400 U. S. P. units of vitamin D daily, either as cod oil or as tuna liver oil (only 62 per cent as effec- as cod liver oil in chick assay), and the results were wed by roentgen and laboratory studies (measure- of serum calcium, phosphorus and phosphatase). th liver oils at all three levels caused significant ction in the amount of serum phosphatase, which oached normal values by the sixth week of treat- . It is indicated that 600 U. S. P. units of vita- D daily from cod liver oil or from some tuna liver is an ample curative dose for most infants with al rickets.

MUNKS, Detroit.

giene; Growth and Nutrition; Public Health

SIOLOGICAL AGE—A FUNDAMENTAL PRINCIPLE. WARD CRAMPTON, Child Development **15**:1 March) 1944.

ere is a revision and second publication of Cramp- significant paper which appeared in its original in 1908. The present short monograph represents substance of some of the author's earlier work in tion to a detailed reporting and analysis of his years ork with over 3,800 school boys in the city of New k.

he article deals in particular with the meaning, in s of a number of accomplishment variables, of the es of sexual maturity of boys of the same chrono- age. The present paper has both omissions from author's addenda to the earlier one and carries an ductory editorial note, some interpolated comments a brief review of the author's work up to the cur- year. Among the omissions are a few charts not ing on the central theme and some of the appendix rial. The presentation is therefore a pointed expo- n of Crampton's thesis that teen-age boys should be sified (and preferably grouped in schools) on a basis heir stages of maturation, or, as he puts it, "physio- al age" or "[stage of] pubescence." Written be- the junior high school era, the paper makes the t that boys in the pubescent stage do not belong or get on well with those either more mature or mature than themselves.

side from its basic conceptional and historical value, paper is of current interest because it raises questions even now deserve more exploration. The author also made several points that are not yet fully gnized and appreciated by many, not only in the of education and its related arts or sciences but in ety as a whole.

he literary style of the monograph is precise and l; there are few technical phrases and those used carefully defined.

THE WEIGHT OF NEGRO INFANTS. HARRY BAKWIN and THOMAS W. PATRICK JR., J. Pediat. **24**:405 (April) 1944.

A comparison was made between the gain in weight of white and that of Negro infants during the first year of life. The Negro infants as well as the white ones were supervised medically from birth. No significant difference was found; the infants in the two groups grew at the same rate.

SEASONAL VARIATIONS IN WEIGHT, HEIGHT AND APPEARANCE OF OSSIFICATION CENTERS. EARLE L. REYNOLDS and LESTER WARREN SONTAG, J. Pediat. **24**:524 (May) 1944.

An investigation was made of the possibility of seasonal variations in weight, in height and in the appearance of specific ossification centers in children during the age span from 12 through 60 months. The data were obtained from serial observations made on 133 children from the Samuel S. Fels Research Institute.

Seasonal variations, similar in the two sexes, were found to exist in each of the three categories. The variation in weight was pronounced; in ossification, moderate, and in height, slight.

The seasonal variations in height and ossification were parallel and opposite to the seasonal variation in weight.

The period of maximum gain in weight was from October to December; of minimum gain, from April to June. The period of maximum gain in height was from April to June; of minimum gain, from October to December. The period of maximum rate of appearance of ossification centers was from March to May; of minimum rate of appearance, from September to November.

Fluctuations in individual growth curves, based on semiannual measurements, were shown to be sharply responsive to seasonal differences in rate of growth. Analyses of deviations in individual growth curves should take into consideration the season of the year which is covered by the interval between measurements.

SONTAG, Yellow Springs, Ohio.

BIRTHS, INFANT MORTALITY, AND MATERNAL MORTALITY IN THE UNITED STATES IN 1942. J. YERUSHALMY, Pub. Health Rep. **59**:797 (June) 1944.

More births were registered in the United States in 1942 than in any previous year. The birth rate was 21.0 per thousand. Ninety-two and six-tenths per cent of the mothers were attended by physicians and 7.4 per cent by midwives. Two of every 3 births took place in hospitals. The infant mortality rate was 40.4 per thousand live births and was lower than in any previous year.

The maternal mortality rate was 25.9 per thousand live births—an all-time low record. This is 31 per cent below the 1940 rate, and is equivalent to saving 5,000 mothers in two years. This reduction was widespread.

SANFORD, Chicago.

Newborn

LATE EFFECTS OF SEVERE ASPHYXIA NEONATORUM: A PRELIMINARY REPORT. G. ROY A. DARKE, J. Pediat. **24**:148 (Feb.) 1944.

It is shown that a statistically significant difference in mental status exists between a group of children

severely asphyxiated and apneic at birth and a control group consisting of the siblings or parents of the children. This difference is shown for the total group and also for subdivisions of the total group.

The far reaching implications of this observation are at once apparent. Reduction of the incidence of anoxia at birth and adequate treatment of the condition offer a point of attack at which some hope for the reduction of the number of mentally defective persons may be had. The preventive and therapeutic methods by which this reduction of anoxia in newborn infants is to be attained are outside the scope of the present paper.

With mental retardation likely in severely asphyxiated children and possible in all asphyxiated children, the importance of using oxygen therapy for neonatal asphyxia may again be emphasized. From a preventive aspect the recent use of continuous caudal anesthesia in obstetrics, with its apparent reduction of trauma at delivery, elimination of narcosis and shortening of the second stage of labor, may prove to be of value.

The study of the mental development of children for whom the oxygen and lactic acid contents of the blood in the umbilical vein are known should be of interest in determining more definitely the degree of anoxemia resulting in mental retardation. There is apparently a combination of degree and duration of anoxia from which nerve tissues are unable to recover adequately. Less severely asphyxiated children do not appear to be significantly retarded in mental development. Severely asphyxiated and apneic newborn infants, with no physical evidence of injury at or following birth, are significantly retarded in mental development.

FROM THE AUTHOR'S SUMMARY.

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Eighty-seven newborn babies were studied in an attempt to establish an approximate minimal effective daily dose of a water-soluble synthetic vitamin K preparation, synkayvite (tetra-sodium 2-methyl-1,4, naphthohydroquinone diphosphoric acid ester). They were divided into six groups; infants in five of the groups received 0.5, 0.05, 0.005, 0.0005 or 0.00005 mg. of the test substance daily; infants in the sixth group served as control subjects. The test substance was given orally, and the infants received no feedings other than breast milk. The prothrombin time was determined by the method of Lawson (*J. Pediat.* **18**:224, 1941).

From the material presented it was concluded that the minimal effective daily dose of the test substance for breast-fed newborn infants lies somewhere between 0.005 and 0.0005 mg. (between 5 and 0.5 micrograms). A dose of 1.25 mg. given once, orally, to each of 6 babies who had excessively long prothrombin times sufficed to lower these times to normal, and in the 5 of the 6 who were followed for three to eight days after the dose the normal prothrombin time was maintained during that time.

Administration of seconal sodium, pentobarbital sodium and sodium amytal to the mothers of about half of these infants during labor had no demonstrable effect on the prothrombin level of the babies, as shown by a comparison of the maximum prothrombin times.

[AUTHOR'S SUMMARY.]

SERUM DIASTASE IN THE NEWBORN INFANT. E... EHRENFEST RICHMAN and GEORGE W. SAL... J. Pediat. **24**:310 (March) 1944.

Seventy-five determinations of serum diastase (m... by the amyloclastic method of Somogyi) were perfor... for 27 full term infants varying in age from 5 to ... hours. The highest values were obtained during ... first three days of life. The highest individual va... obtained for the first, second and third days were 34 ... and 28 respectively. During the remainder of the pe... values below 15 were obtained with but 2 excepti... The somewhat higher values obtained in the first t... days of life may possibly represent a persistence ... enzyme supplied by the mother. These values ... strikingly low when compared with the average va... obtained for adults (80 to 150). The value obtained ... in no way correlated with the sex, the weight at b... or the icteric index of the infant.

SALMON, St. Lou...

A DOUBLE OVA PREGNANCY IN WHICH THE R... TWIN DEVELOPED ERYTHROBLASTOSIS. EDITH POTTER, J. Pediat. **24**:449 (April) 1944.

A case of twins, one of whom died of erythroblast... while the other remained normal, is reported. ... affected twin and the father had Rh-positive blo... the normal twin and the mother had Rh-negative blo... It is contended that the father was heterozygous ... the Rh factor and that two ova were fertilized, one ... a sperm carrying an Rh-positive gene and the o... by a sperm carrying an Rh-negative gene. The mo... had been sensitized to the Rh factor either in a p... vious pregnancy, when a fetus with Rh-positive bl... was carried, or possibly during the course of this pr... nancy. The antibodies produced in the mother pa... through the placentas of both fetuses but affected ... the one which had Rh-positive blood. The cells of ... latter fetus contained the Rh antigen and could ... agglutinated by the Rh antibodies; the cells of the o... fetus contained no antigen and therefore could not ... agglutinated. The fetus whose cells were agglutin... had erythroblastosis; the one whose cells were ... agglutinated remained well.

POTTER, Chicag...

REDUCING THE HAZARDS DURING THE FIRST WEEK ... LIFE. JOHN W. PRENTICE, Wisconsin M. J. **43**:... (March) 1944.

Procedures to reduce the pain and time of labor ... the administration of drugs definitely increase the ... to the infant. Control of asphyxia, the pathologic b... of which is that of anoxia, centers on the period bef... birth.

Intrauterine anoxia produces congestion, ede... hemorrhage and tissue degeneration. If pulmonary fu... tion is impaired before birth, a negative oxygen bala... may continue postnatally and increase the injury.

Oxygen given the mother in suspected fetal asphy... until delivery occurs is most helpful. It should be gi... the infant thereafter until improvement occurs.

Vitamin K is useful in prevention of cerebral hem... rhage.

JANNEY, Wauwatosa, Wis...

CAUSE OF DEATH OF NEWBORN BABIES. S. E... and G. H. NEWNS, Brit. J. Child Dis. **40**:36 (Ap... June) 1943.

This report from the Hospital for Sick Childr... Great Ormond Street, London, England, is based on ...

rvations at autopsy on 112 infants who died within first four weeks of life.

	Week					
	I	II	III	IV	Total	%
irth injury	4	0	0	0	4	3.5
lalformations	18	13	8	5	44	39
rematurity	6	0	7	1	14	12.5
rythroblastosis	3	1	0	2	6	5
lemorrhagic disease	9	7	2	0	18	15
epticemia	1	3	5	4	13	11
astroenteritis	0	0	3	3	6	5
aria	1	1	4	1	7	6
	42	25	29	16	112	

he authors conclude that about 30 to 50 per cent of neonatal deaths could be prevented by prompt and per diagnosis. Every one who deals with newborn es professionally should be made conscious of the icular dangers of this age period.

LANGMANN, New York.

Acute Contagious Diseases

E MECHANISM OF MUSCLE SPASM IN POLIOMYELITIS. HERMAN KABAT and M. E. KNAPP, J. Pediat. **24**:123 (Feb.) 1944.

Iuscle spasm in poliomyelitis is neurogenic and is arently the result of release from inhibition of spinal prioceptive reflexes. Muscle spasm is eliminated porarily in acute and subacute stages of the disease spinal anesthesia or block of the myoneural junction; the other hand, in 2 patients who had had the con- on for fourteen months spinal anesthesia had little ct on muscle spasm. Muscle spasm is associated n increased action potentials in the affected muscles uman and Schwartz).

he lesion in the spinal cord resulting in muscle sm is distinct and separate from the lesion in the e motor neurons of the anterior horn. Many muscles spasm show normal chronaxia, while other muscles spasm show more or less definite increases in chron- a (Moldaver). Similarly, many muscles in spasm not undergo atrophy, while others show various rees of atrophy and paralysis. These facts suggest t destruction of the motor neurons in the anterior n is not the basis of muscle spasm in poliomyelitis. Evidence is presented to support the theory that the hologic basis of muscle spasm in poliomyelitis is a on of internuncial neurons in the gray matter of spinal cord.

. Muscle spasm, similar in many respects to that erved in patients with poliomyelitis, has been pro- ed in experimental animals. Correlated with the scle spasm the spinal cord showed a lesion localized the internuncial neurons, while the cells of the an- ior horn appeared normal.

. In 68 cases of poliomyelitis, review of the patho- ic changes in the spinal cord revealed an internuncial on in almost every patient. Twenty-six patients wed internuncial lesions with relatively normal cells the anterior horn in the sections examined. It has n known for many years that the pathologic changes he spinal cord are not confined to the motor neurons the anterior horn.

. Synaptic endings on large motor neurons in the erior horn are extensively degenerated in poliomye- s (Minckler). These synaptic endings originate pre- minantly in the internuncial neurons.

4. Neostigmine, acting on the spinal cord to inhibit proprioceptive reflexes, decreases muscle spasm.

Why should the internuncial lesion eliminate inhibitory mechanisms without blocking impulses for excitation of muscle tonus and stretch reflexes? A recent observation by Lloyd helps to explain this phenomenon. He has demonstrated that the proprioceptive reflex arc in the cat is composed of two neurons, with no interposed internuncial neuron. Therefore, the nerve impulses for excitation of tonus and stretch reflexes would be conducted to the motor neurons through the gray matter of the spinal cord only by nerve fibers. Since nerve cell bodies are susceptible to the virus of poliomyelitis but nerve fibers do not appear to be attacked directly by the virus, excitation of the proprioceptive reflexes would not be blocked by virus involvement of the internuncial region. On the other hand, since impulses for inhibition of tonus and stretch reflexes are conducted through the internuncial neurons, attacks by the virus on these neurons would lead to exaggeration of proprioceptive reflexes, as a result of release from inhibition.

The functional changes in poliomyelitis can best be explained as the result of lesions of two types in the gray matter of the spinal cord, varying in distribution and severity in the different segments. One type includes lesions involving large motor neurons in the anterior horn, leading to motor denervation with paralysis and atrophy; the other type includes lesions involving internuncial neurons. Because of the strategic position of these neurons as the elements of a switchboard which directs reflex and voluntary impulses to the adjacent anterior horn cells, such a lesion may theoretically have the following consequences: (*a*) muscle spasm, resulting from decreased inhibition of proprioceptive reflexes; (*b*) disorganization of the flow of impulses to the anterior horn cells and thus to the motor units, resulting in poor coordination of agonists, synergists and antagonists and in fasicular twitchings, and (*c*) decrease or loss of voluntary power because of failure of voluntary impulses to be conducted to remaining functional motor neurons.

KABAT, Boston.

IMMUNIZATION IN PEDIATRIC PRACTICE. EDGAR J. HUENEKENS, Wisconsin M. J. **43**:409 (April) 1944.

Unless there is a likelihood of exposure, most immunizations are better done in the second half of the first year of life. Protection against smallpox may be given soon after birth, and against pertussis as early as the fourth month.

Sauer's or Kendrick's vaccine protects all but 15 per cent of children against pertussis, and these have it mildly. Mild reactions occur in 50 per cent of the subjects. Immunity lasts at least several years; stimulating doses may be wise. For the nonimmunized but exposed, human hyperimmune serum is advised. For diphtheria prevention three doses of the Ramon toxoid given at monthly intervals are preferred to use of the alum-precipitated toxoid.

Tetanus toxoid is recommended for all allergic children.

Its general use, like that of scarlet fever immunization, is left to the individual physician but is conceded to have value.

JANNEY, Wauwatosa, Wis.

POSTNASAL SWAB IN DIAGNOSIS OF PERTUSSIS. ROBERT CRUIKSHANK, Lancet **1**:176 (Feb. 5) 1944.

A nasopharyngeal swab taken through the mouth and inoculated on a "penicillin plate" (a plate impregnated with 4 to 8 drops of a suitable dilution of peni-

severely asphyxiated and apneic at birth and a control group consisting of the siblings or parents of the children. This difference is shown for the total group and also for subdivisions of the total group.

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Administration of seconal sodium, pentobarbital sodium and sodium amytal to the mothers of about half of these infants during labor had no demonstrable effect on the prothrombin level of the babies, as shown by a comparison of the maximum prothrombin times.

[AUTHOR'S SUMMARY.]

SERUM DIASTASE IN THE NEWBORN INFANT. E... EHRENFEST RICHMAN and GEORGE W. SA... J. Pediat. **24**:310 (March) 1944.

Seventy-five determinations of serum diastase (m... by the amyloclastic method of Somogyi) were perfor... for *27* full term infants varying in age from 5 to ... hours. The highest values were obtained during ... first three days of life. The highest individual va... obtained for the first, second and third days were 34 ... and 28 respectively. During the remainder of the pe... values below 15 were obtained with but 2 excepti... The somewhat higher values obtained in the first t... days of life may possibly represent a persistence ... enzyme supplied by the mother. These values ... strikingly low when compared with the average va... obtained for adults (80 to 150). The value obtained ... in no way correlated with the sex, the weight at b... or the icteric index of the infant.

SALMON, St. Lou...

A DOUBLE OVA PREGNANCY IN WHICH THE R... TWIN DEVELOPED ERYTHROBLASTOSIS. EDITH POTTER, J. Pediat. **24**:449 (April) 1944.

A case of twins, one of whom died of erythroblast... while the other remained normal, is reported. T... affected twin and the father had Rh-positive blo... the normal twin and the mother had Rh-negative blo... It is contended that the father was heterozygous ... the Rh factor and that two ova were fertilized, one ... a sperm carrying an Rh-positive gene and the o... by a sperm carrying an Rh-negative gene. The mo... had been sensitized to the Rh factor either in a p... vious pregnancy, when a fetus with Rh-positive bl... was carried, or possibly during the course of this pr... nancy. The antibodies produced in the mother pa... through the placentas of both fetuses but affected o... the one which had Rh-positive blood. The cells of ... latter fetus contained the Rh antigen and could ... agglutinated by the Rh antibodies; the cells of the o... fetus contained no antigen and therefore could not ... agglutinated. The fetus whose cells were agglutina... had erythroblastosis; the one whose cells were ... agglutinated remained well.

POTTER, Chicago.

REDUCING THE HAZARDS DURING THE FIRST WEE... LIFE. JOHN W. PRENTICE, Wisconsin M. J. **43**:... (March) 1944.

Procedures to reduce the pain and time of labor ... the administration of drugs definitely increase the ri... to the infant. Control of asphyxia, the pathologic ba... of which is that of anoxia, centers on the period be... birth.

Intrauterine anoxia produces congestion, ede... hemorrhage and tissue degeneration. If pulmonary fu... tion is impaired before birth, a negative oxygen bala... may continue postnatally and increase the injury.

Oxygen given the mother in suspected fetal asphyx... until delivery occurs is most helpful. It should be gi... the infant thereafter until improvement occurs.

Vitamin K is useful in prevention of cerebral hem... rhage.

JANNEY, Wauwatosa, Wis.

CAUSE OF DEATH OF NEWBORN BABIES. S. Es... and G. H. NEWNS, Brit. J. Child Dis. **40**:36 (Ap... June) 1943.

This report from the Hospital for Sick Childr... Great Ormond Street, London, England, is based on ...

rvations at autopsy on 112 infants who died within first four weeks of life.

	Week					
	I	II	III	IV	Total	%
irth injury	4	0	0	0	4	3.5
lalformations	18	13	8	5	44	39
rematurity	6	0	7	1	14	12.5
rythroblastosis	3	1	0	2	6	5
lemorrhagic disease	9	7	2	0	18	15
epticemia	1	3	5	4	13	11
astroenteritis	0	0	3	3	6	5
aria	1	1	4	1	7	6
	42	25	29	16	112	

he authors conclude that about 30 to 50 per cent of neonatal deaths could be prevented by prompt and er diagnosis. Every one who deals with newborn es professionally should be made conscious of the icular dangers of this age period.

LANGMANN, New York.

Acute Contagious Diseases

E MECHANISM OF MUSCLE SPASM IN POLIOMYELITIS. HERMAN KABAT and M. E. KNAPP, J. Pediat. **24**:123 (Feb.) 1944.

Iuscle spasm in poliomyelitis is neurogenic and is arently the result of release from inhibition of spinal rioceptive reflexes. Muscle spasm is eliminated porarily in acute and subacute stages of the disease pinal anesthesia or block of the myoneural junction; he other hand, in 2 patients who had had the con- on for fourteen months spinal anesthesia had little ct on muscle spasm. Muscle spasm is associated h increased action potentials in the affected muscles uman and Schwartz).

he lesion in the spinal cord resulting in muscle sm is distinct and separate from the lesion in the e motor neurons of the anterior horn. Many muscles pasm show normal chronaxia, while other muscles pasm show more or less definite increases in chron- (Moldaver). Similarly, many muscles in spasm not undergo atrophy, while others show various rees of atrophy and paralysis. These facts suggest destruction of the motor neurons in the anterior n is not the basis of muscle spasm in poliomyelitis. vidence is presented to support the theory that the nologic basis of muscle spasm in poliomyelitis is a on of internuncial neurons in the gray matter of spinal cord.

. Muscle spasm, similar in many respects to that erved in patients with poliomyelitis, has been pro- ed in experimental animals. Correlated with the scle spasm the spinal cord showed a lesion localized he internuncial neurons, while the cells of the an- or horn appeared normal.

. In 68 cases of poliomyelitis, review of the patho- ic changes in the spinal cord revealed an internuncial on in almost every patient. Twenty-six patients wed internuncial lesions with relatively normal cells he anterior horn in the sections examined. It has n known for many years that the pathologic changes he spinal cord are not confined to the motor neurons he anterior horn.

. Synaptic endings on large motor neurons in the erior horn are extensively degenerated in poliomye- (Minckler). These synaptic endings originate pre- inantly in the internuncial neurons.

4. Neostigmine, acting on the spinal cord to inhibit proprioceptive reflexes, decreases muscle spasm.

Why should the internuncial lesion eliminate inhibitory mechanisms without blocking impulses for excitation of muscle tonus and stretch reflexes? A recent observation by Lloyd helps to explain this phenomenon. He has demonstrated that the proprioceptive reflex arc in the cat is composed of two neurons, with no interposed internuncial neuron. Therefore, the nerve impulses for excitation of tonus and stretch reflexes would be conducted to the motor neurons through the gray matter of the spinal cord only by nerve fibers. Since nerve cell bodies are susceptible to the virus of poliomyelitis but nerve fibers do not appear to be attacked directly by the virus, excitation of the proprioceptive reflexes would not be blocked by virus involvement of the internuncial region. On the other hand, since impulses for inhibition of tonus and stretch reflexes are conducted through the internuncial neurons, attacks by the virus on these neurons would lead to exaggeration of proprioceptive reflexes, as a result of release from inhibition.

The functional changes in poliomyelitis can best be explained as the result of lesions of two types in the gray matter of the spinal cord, varying in distribution and severity in the different segments. One type includes lesions involving large motor neurons in the anterior horn, leading to motor denervation with paralysis and atrophy; the other type includes lesions involving internuncial neurons. Because of the strategic position of these neurons as the elements of a switchboard which directs reflex and voluntary impulses to the adjacent anterior horn cells, such a lesion may theoretically have the following consequences: (*a*) muscle spasm, resulting from decreased inhibition of proprioceptive reflexes; (*b*) disorganization of the flow of impulses to the anterior horn cells and thus to the motor units, resulting in poor coordination of agonists, synergists and antagonists and in fasicular twitchings, and (*c*) decrease or loss of voluntary power because of failure of voluntary impulses to be conducted to remaining functional motor neurons.

KABAT, Boston.

IMMUNIZATION IN PEDIATRIC PRACTICE. EDGAR J. HUENEKENS, Wisconsin M. J. **43**:409 (April) 1944.

Unless there is a likelihood of exposure, most immunizations are better done in the second half of the first year of life. Protection against smallpox may be given soon after birth, and against pertussis as early as the fourth month.

Sauer's or Kendrick's vaccine protects all but 15 per cent of children against pertussis, and these have it mildly. Mild reactions occur in 50 per cent of the subjects. Immunity lasts at least several years; stimulating doses may be wise. For the nonimmunized but exposed, human hyperimmune serum is advised. For diphtheria prevention three doses of the Ramon toxoid given at monthly intervals are preferred to use of the alum-precipitated toxoid.

Tetanus toxoid is recommended for all allergic children.

Its general use, like that of scarlet fever immunization, is left to the individual physician but is conceded to have value.

JANNEY, Wauwatosa, Wis.

POSTNASAL SWAB IN DIAGNOSIS OF PERTUSSIS. ROBERT CRUIKSHANK, Lancet **1**:176 (Feb. 5) 1944.

A nasopharyngeal swab taken through the mouth and inoculated on a "penicillin plate" (a plate impregnated with 4 to 8 drops of a suitable dilution of peni-

cillin one-half to one hour before being inoculated) of Bordet-Gengou medium gave as good results as a cough plate in the bacteriologic diagnosis of pertussis.

LANGMANN, New York.

SEROAGGLUTINATION REACTION OF WELTMANN IN TYPHOID FEVER IN CHILDREN. W. AYALA BONILLA and E. GONZALEZ LAGROTTA, Arch. de pediat. d. Uruguay **15**:80 (Feb.) 1944.

The authors suggest that marked lowering (or "shift to the left") of the Weltmann coagulation band may be of aid in the diagnosis of typhoid. They report on the results of 67 tests carried out in 32 cases of typhoid in children and show the usual correlation with the erythrocyte sedimentation rate, particularly during the first fifteen days of the disease. Technic and results are discussed.

PLATOU, New Orleans.

Acute Infectious Diseases

SALMONELLOSIS CAUSED BY THE INGESTION OF DUCKS' EGGS. I. SNAPPER, Am. J. Digest. Dis. **11**:8 (Jan.) 1944.

Human salmonellosis arising from the consumption of eggs from ducks and pigeons infected with Salmonella is of common occurrence in western Europe and the Netherlands East Indies. At least one outbreak of salmonellosis caused by the ingestion of eggs of infected pigeons has been recorded. In the United States outbreaks of salmonellosis of human beings caused by the use of infected ducks' eggs are rare, but one such outbreak occurred in Kansas. The possibility that the use of ducks' eggs for food may be at least partly responsible for the frequency of salmonellosis of human beings is discussed.

Salmonellosis not uncommonly infects the ovarian follicles of ducks. This explains why the yolks of eggs of infected ducks often contain salmonellas and why such eggs when ingested can cause salmonellosis of human beings. To this should be added the fact that as they are laid the eggs pass through the cloaca, so that they are nearly always heavily soiled with stool. Hence, even when the contents of an egg from an infected duck are free from pathogenic bacteria, contamination with Salmonellae may occur when the eggshell is broken by the cook.

MORRISON, Savannah, Ga.

HISTOPLASMOSIS. PARKER R. BEAMER, EDWARD B. SMITH and HENRY L. BARNETT, J. Pediat. **24**:270 (March) 1944.

Generalized histoplasmosis in a boy 11 months of age is reported, with postmortem, mycologic and experimental data. Lesions were found in the lungs, liver, spleen, adrenal glands, kidneys, colon, appendix, bone marrow, lymph nodes and blood vessels.

Macroscopically visible colonies of Histoplasma capsulatum were observed on blood agar plates (incubated aerobically at room temperature) on the fourth day after inoculation with blood taken from the heart at autopsy.

Yeastlike forms of the fungus were observed in blood films prepared post mortem. Experiments indicate that Histoplasma capsulatum is resistant to drying and to low temperatures (from 5 to 8 C.). Histoplasma capsulatum in milk is destroyed by heating at 62 to 63 C. for twenty minutes. Infection of guinea pigs, normal and vitamin C deficient, could not be established by oral administration of large numbers of organisms.

FROM THE AUTHORS' SUMMARY.

PARALYTIC RABIES. SELBY V. LOVE, J. Pediat. **24**: (March) 1944.

The virus of rabies may produce a disease in w flaccid paralysis is the outstanding feature and which classic symptoms of rabies may fail to ap In 1929 Knutti (Vanderbilt University Hospital) ported the first such case in this country. Acute asc ing paralysis developed, and the patient died on the day after the onset of symptoms without ever ha experienced any difficulty in swallowing, pharyn spasms or hydrophobia. The present case report with the illness of a 4½ year old child who bec paralyzed in both lower extremities three and one months after being bitten by a mad dog. The pa died on the twelfth day after the onset of symp without ever having the classic symptoms of ra Four similar case reports (van Gehuchten, Uribe, C and Babes) were found in foreign literature, and t are fairly numerous reports of patients who becam with a paralytic disease but in whom classic symp of rabies ultimately developed.

A review of these cases suggests that paralytic ra runs a much less fulminating course than the ordi form of rabies. The average duration of life in t patients in whom classic rabies symptoms failed appear was nearly twelve days.

Paralytic rabies may be confused with poliomye Features suggesting that the disease is not poliomye are (*a*) disturbances in sensation (present in 5 of t patients) and (*b*) fever in the absence of any det strable complicating infection, persisting or first app ing many days after the onset of paralysis. In cas which classic symptoms of rabies ultimately appear, true diagnosis immediately becomes apparent.

Postmortem histologic studies have usually rev extensive degenerative or destructive changes in t the motor and sensory portions of the spinal cord. the 2 cases at Vanderbilt University Hospital N bodies were found not only in the spinal cord or b of the patient but in the brain of a rabbit inocul with material from the patient.

These cases of paralytic rabies are similar to th reported on the island of Trinidad. There the ra virus was found to be transmitted to human victims the bites of infected vampire bats. It was sugge that the virus undergoes a modification in bats t renders it able to produce only the paralytic form the disease.

LOVE, Nashville, Ten

REPORT OF AN OUTBREAK OF GONORRHEA AT A B SCHOOL. ROBERT WESTPHAL, New York State Med. **44**:493 (March 1) 1944.

Seventeen of 67 boys (Negro) in a school organi for rehabilitation after misdemeanors were infected w gonorrhea. The boys ranged in age from 9 to 16 ye One boy aged 13 was infected by an older girl. T disease was introduced by him into the school and w spread among the boys through homosexual acts. Su thiazole was found very valuable in both the con and the treatment of the disease.

AIKMAN, Rochester, N. Y

Chronic Infectious Diseases

THE PSYCHOLOGIC CARE OF CHILDREN WITH P MONARY TUBERCULOSIS. EDWIN L. KENDIG JR. Pediat. **25**:79 (July) 1944.

Since rest in bed is the basic principle of the tr ment of pulmonary tuberculosis, methods must be

l to make this treatment acceptable to the child must be treated at home. It is the physician's to outline for the parents certain principles for hing the child to achieve both mental and physical xation.

he attitude of the parents must be regulated. They not blame themselves for the child's illness. They ld lead as normal lives as possible but should nge to spend some time each day with the child. parents should not discuss the child's illness in presence or exhibit anxiety in any way.

he sick child should have a daily schedule of rest, k and play, with an occasional variation in routine. rything the child may need should be placed within reach, but a bell should also be conveniently near. ntal overindulgence must be discouraged.

very sick child should have a bed table, at which ay play quietly if his physical condition permits. toys should be of a type which suggests playing ly at the bed table and should be doled out one time. For children 2 to 6 years of age picture s, unpainted blocks, housekeeping toys, dolls, on color books, clay, simple wooden puzzles and ching games" are helpful. An occasional "grab " consisting of a dozen toys of from a value of 5 0 cents, is also useful. Older children may find ure in reading, drawing, coloring with crayons, ving, knitting, soap carving and playing with con- tion sets. Daily supervised visits by other chil- should be arranged unless contraindicated by the municable nature of the disease.

fter the acute stage of the illness is past, arrange- ts should be made for the school child to keep up his school work by means of regular daily assign- ts, culminating when indicated in graduation exer- . During rehabilitation the convalescent child ires careful supervision.

KENDIG, Richmond, Va.

Diseases of the Blood, Heart and Blood, Vessels and Spleen

UMATIC CARDIAC INJURY IN A CHILD WITH PROB- BLE RUPTURE OF INTERVENTRICULAR SEPTUM. EDWIN D. BAYRD and STANLEY GIBSON, J. Pediat. 4:138 (Feb.) 1944.

Negro boy 11 years of age was hit by an automobile e coasting and lost consciousness for a short time. n he was admitted to the hospital, the patient com- ed of headache and of severe pain in the left upper of the abdomen. Examination revealed a tense omen, a loud, harsh systolic murmur and a thrill the precordium. The boy had been seen many s previously in the outpatient department, and his t had been consistently noted to be normal. An rocardiogram showed no abnormalities. The patient discharged from the hospital at the end of a week. days later he returned, at which time it was dis- red that the cardiac murmur was now musical in acter, completely different from the harsh rumbling mur previously heard. The thrill persisted. An rocardiogram revealed an elevated ST segment in IV, and deeply inverted T waves in leads II, III IV. Subsequent electrocardiograms revealed the gressive changes found in persons with coronary usion. The patient was kept in bed for six weeks, ng during this period no complaints except a king" pain over his heart in the early part of the od. He has since returned to school. The electro- iograms offer proof that he suffered myocardial damage. The location, timing and quality of the murmur lead the authors, from clinical experience and from reports in the literature, to believe that he suffered a rupture of the interventricular septum. The change in the character of the murmur which was noted about seventeen days after the accident might be explained in various ways, such as narrowing or enlarging of the defect or rupture of chordae tendineae or of a papillary muscle. No report of a similar case was found in the medical literature.

GIBSON, Chicago.

CONGENITAL LEUCEMIA. FRANK S. CROSS, J. Pediat. 24:191 (Feb.) 1944.

Since 1918 at the Children's Memorial Hospital in Chicago there have come to autopsy 38 cases of leukemia, 24 of the lymphogenous and 14 of the myelogenous type. Eight of the patients, 2 with lymphogenous and 6 with myelogenous leukemia, were under 1 year of age. In 2 of these patients, both with myelogenous leukemia, the condition was apparently congenital. The histories of these 2 patients are reported in detail. One of the reports is of particular interest not only because the condition described was congenital leukemia but because the patient had unusual cutaneous manifestations. Over the axilla and groin and around the neck and ear the skin was excoriated and covered with dry, thick, yellow, crustlike plaques of tissue of exudate. Removal of the plaques left persistently bleeding surfaces. At autopsy it was observed that the superficial cornified layer of the skin in these areas was missing and the basal layer was greatly thickened. A review of the literature of the past twenty-five years reveals reports of 20 cases of congenital leukemia, of which 16 were of the myelogenous, 3 were of the lymphogenous and 1 was of a questionable type.

CROSS, Lansing, Mich.

BONE MARROW TRANSFUSIONS AS A ROUTINE PROCEDURE IN CHILDREN. FRANK MEOLA, J. Pediat. 25:13 (July) 1944.

With 326 infusions via the bone marrow made in 144 infants and children, there were only 1 reaction and 1 complication not related to the procedure. This result confirms the conclusions of Tocantins (Philadelphia) and his co-workers as to the applicability and ease of this method of giving fluids and medicaments. The technic and its difficulties are briefly mentioned.

MEOLA, Akron, Ohio.

HUMAN SERUM AND PLASMA IN PEDIATRIC PRACTICE. ERLING S. PLATOU and PAUL F. DWAN, Minnesota Med. 27:190 (March) 1944.

The relative lability of the infant's fluid matrix, his lack of immune response to many infections and the nature of disturbances peculiar to his age combine to pose a threat which can often be countered most effectively by physiologic constituents of blood. As a result, human serum and plasma have found an especially secure place as therapeutic agents in diseases of children. The authors make a fairly extensive review of the literature in order to emphasize the importance of serum therapy, and this makes a very interesting report. In the last paragraph of the paper the statement is made that the dosage of human plasma and serum must depend on the weight of the child and the seriousness of the condition for which the serum is to be employed. For the transfer of specific antibodies in prophylaxis and treatment of disease doses of 10 to 100 cc. are usually given. In the treatment of chronic infections and hypoproteinemic

states doses should be gaged to accomplish physiologic levels of plasma proteins. The following illustration is given in computing the approximate amount of protein needed by a 10 Kg. baby whose plasma protein level is 5.3 Gm. per hundred cubic centimeters of blood.

Plasma protein (patient), 5.3 Gm. per hundred cubic centimeters of blood
Plasma protein (normal), 6.7 Gm. per hundred cubic centimeters of blood
Deficit, 1.5 Gm. per hundred cubic centimeters of blood
Weight of patient, 10 Kg.
Blood volume (8 per cent), 800 cc.
Deficit 8 × 1.5, 12.0 Gm.
12.0 Gm., 175 to 200 cc. of plasma

STOESSER, Minneapolis.

INFECTIOUS MONONUCLEOSIS. HENRY B. SOKAL, New York State J. Med. **43**:848 (May 1) 1943.

Five cases in children are reported. Sokal believes that a high lymphocyte count alone without other symptoms should be interpreted as evidence that the disease occurred in the past rather than as an indication of an active infection.

AIKMAN, Rochester, N. Y.

ERYTHROBLASTIC ANEMIA OF CHILDHOOD (COOLEY'S ANEMIA) IN CYPRUS. ALAN L. FAWDRY Lancet **1**: 171 (Feb. 5) 1944.

The features of 20 cases of erythroblastic anemia observed in Cyprus are presented and discussed. All the patients were Greek Cyprians. There was a predominance of male patients.

LANGMANN, New York.

THE RH-FACTOR. B. DURIE, M. J. Australia **1**:333 (April 15) 1944.

In an excellent review of the subject Durie traces the evolution of the knowledge of hemagglutination, with special emphasis on the ideas which led to the discovery of the Rh factor and of the anti-Rh agglutinin.

GONCE, Madison.

HEMOPHILIA IN A NINE MONTH OLD INFANT. ADELINA E. TAMBORINI, JOSE M. ALBORES and JOSE MORAN, Arch. argent. de pediat. **21**:235 (March) 1944.

A case of hemophilia in an infant is reported. The first signs appeared at the age of 9 months. Involvement of joints was observed at 2 years. The coagulation time calculated by the Burke method was normal, whereas a delayed clotting time was found when blood was drawn by venous puncture. Clot retraction was normal.

The authors advocate the determination of the clotting time by vein puncture in order to prevent errors. The patient was treated with blood transfusions and local application of compresses soaked with breast milk.

CASSORLA, San Francisco.

Diseases of Nose, Throat and Ear

SOLITARY NEUROFIBROMA OF THE LARYNX. THOMAS T. SMITH, Arch. Otolaryng. **39**:144 (Feb.) 1944.

Reported here are cases of neurofibroma with photographs. It is stated that the laryngoscopic findings are not diagnostic. However, a firm, single, encapsulated, grayish to yellowish-pink tumor occupying the upper part of the larynx is suggestive of solitary neu fibroma. Removal of tissue for biopsy is usually di cult or impossible; therefore, the final diagnosis rarely made until complete extirpation has been accom plished. Surgical excision is the treatment of choi

GREENWOOD, Chicago.

THE RELATION BETWEEN SPEECH-SOUND DISCRIMI TION AND PERCENTAGE OF HEARING LOSS. J UTLEY, J. Speech Disorders **9**:103 (June) 1944.

The author studied 51 pupils in a school for deaf, ranging in age from 9 years 2 months to years 2 months. Twenty-five were male and 26 fema 21 were congenitally deaf. The pupils were stud by means of individual audiometric tests made w the Maico D-5 audiometer. They were also given test for discrimination of speech sounds by paired wor for vowels and for consonants. These tests were p sented over a multiple hearing aid, since none of t patients could understand speech without amplificati The intelligence quotient was also available. Err on the vowel test and errors on the consonant test a positively correlated. Age was not a factor in t test. The intelligence quotients of the patients we not factors. The higher the frequency loss, the grea the increase in errors in discrimination between sou Vowel losses are particularly associated with losses frequency at 1024 and 2048. Losses of 512, 1024 a 2048 are about equally correlated with errors in co sonant loss. Residual hearing at 1024 and 2048 is equa important on the basis of discrimination of vowels a consonants. Five different methods of determini percentage loss for speech were employed, the Sab showing the largest range of percentage score and t Western Electric showing the smallest range. In of the five methods there is a high correlation betwe speech loss and percentage loss of hearing. When five methods of computing percentage loss are p together the correlation with speech loss ranges fr .95 to .99. The author reaches the general conclusi that the percentage method for computing hearing lo is more accurate than has been supposed. On the ba of the data it is not possible to state which meth of computing hearing loss percentage is the best. Fu ther study is indicated.

PALMER, Wichita, Kan.

THE PURE TONE SCREEN TEST OF HEARING. GOR E. PETERSON, J. Speech Disorders **9**:114 (Ju 1944.

This report gives the results of the testing of 3,3 children from the public schools of Indiana during t year 1942-1943. The sweep check method was e ployed, with use of both the Western Electric 6B a the Maico 5D audiometer. The article contains careful description of the technic employed. The aut checked 100 children per day. Of the 3,393 childr 21.75 per cent failed the first test. Retests were gi to 571, or 16.82 per cent; of these children, 294, 8.66 per cent, failed the second test. One hundred t thirty of this group had a loss of 20 decibels or grea on 2 or more frequencies in one ear only, and 164 h such losses in both ears. Eighty-four of the cases, 2.48 per cent, had slight or greater impairment of hea ing, for the comprehension of speech in both ears.

PALMER, Wichita, Kan.

RELATIONSHIP OF EAR PREFERENCE TO OTHER LATERALITY CHARACTERISTICS. CLAUDINE MOUNSET and GORDON E. PETERSON, J. Speech Disorders **9**: 1 (June) 1944.

ty-five subjects were tested by Peterson's test of preference, which consists of placing the subject a sound-emitting unit which gives a faint tone, subject then inclining the preferred ear to the e of sound. The same subjects were given ies of tests for hand, foot and eye preference. y-seven, or 17 per cent of the subjects, preferred ame ear and hand. Three subjects were incon- t in ear and hand preference. Thirteen, or 28.9 ent of the subjects, preferred the same ear and n the test used. One subject was inconsistent in preference and also in eye preference. Twenty- subjects were consistent in one of the character- and inconsistent in the others. Only 7 subjects stently preferred the opposite ear and eye. Nine- or 42.2 per cent of the subjects, preferred the ear and foot. Six subjects were inconsistent in preference and also in choice of foot. Fifteen were stent in one characteristic but inconsistent in the . Only 4 subjects consistently preferred the oppo- ear and foot. The authors state that these data ate that there is some positive relationship between preference and other laterality characteristics, al- h the data indicate also that the relationship is close.

PALMER, Wichita, Kan.

RELATION BETWEEN EAR PREFERENCE AND HEAR- G ACUITY. E. W. BILTO and GORDON E. PETER- N, J. Speech Disorders **9**:123 (June) 1944.

ty-nine subjects were tested by Peterson's test of preference and also with the pure tone audiometer. he 69 subjects, 39 were right eared, 13 were left and 17 were inconsistent. Of the 39 subjects right ear preference, 48.7 per cent had superior ear acuity scores and 43 per cent had superior ear acuity scores. Of the 13 subjects showing ear preference, 5 had superior acuity in the right 6 in the left ear. These data indicate that there o significant relationship between ear preference difference in auditory acuity between the two The data apparently indicate, however, that a ear preference may occur more frequently in cases hich the left ear is definitely superior to the right. e subjects show the right ear preference than the ear preference. Acuity of the ears is fairly equal he general population.

PALMER, Wichita, Kan.

ITORY ACUITY AND ITS RELATION TO DEFECTIVE PEECH. E. MARGARET SULLIVAN, J. Speech Dis- rders **9**:127 (June) 1944.

group of 1,501 children in the Minneapolis public ol system who are speech defectives were studied audiometer test results against 25,708 elementary ol children in the same school system who had ise had audiometer tests. A slightly higher per- ge of the total group of speech defectives in this y show a loss of hearing in one or both ears. A iderably higher percentage of the stutterers, chil- with structural articulatory difficulties and orally ive children show a loss of hearing in one or both Children with faulty articulation of sibilants no more loss of hearing than other children in general public school population. Significantly, however, not all speech defectives in the Minneapolis public school system were studied, and among the control group were many with defects of speech.

PALMER, Wichita, Kan.

TEACHING DEAF CHILDREN TO TALK. RUTH BECKEY IRWIN, J. Speech Disorders **9**:131 (June) 1944.

This is a brief report on the early work with a child who had severe hearing disability and lack of speech. The motokinesthetic method was used for the most part, and it was also necessary to do considerable work with emotional adjustment and stimulus by means of sight.

PALMER, Wichita, Kan.

A COUNTY SPEECH AND HEARING CONSERVATION PROGRAM. ALFRED LARR, J. Speech Disorders **9**:147 (June) 1944.

This article discusses the problem of meeting the needs of children handicapped in speech and hearing in the schools of Vigo County, Indiana. Group hearing tests and speech surveys were carried on in all schools. First, teachers reported children who were defective in speech. Only 7 per cent of those reported proved not to have any defects. Children who presented behavior problems and children of low mentality comprised the greater part of this group. Teacher education, community education and follow-up work were carefully organized. Mimeographed forms with printed instructions were given to each teacher two weeks after the school year had begun, and three weeks elapsed before any lists were collected from teachers. The implication of the study is that without the use of audiometers teachers in grades 1 through 6 tend to observe the existence of an 18 decibel or greater hearing loss in both ears but do not readily observe slighter losses in one or both ears.

PALMER, Wichita, Kan.

ACUTE LARYNGO-TRACHEO-BRONCHITIS. F. ARDEN and J. V. DUHIG, M. J. Australia **1**:145 (Feb. 19) 1944.

Although various organisms have been held responsible for acute laryngotracheobronchitis by various writers, Arden and Duhig state the belief that a disease with such uniform pathologic effects must be due to a specific etiologic agent. The pathologic changes, complete widespread necrosis of the tracheal mucosa and submucosal vascular dilatation without cellular exudate except for a scanty lymphocytic infiltration, are phenomena more in keeping with a virus than with a bacterial infection. The persistence of the mucous glands and their ducts—which, incidentally, excludes corynebacterium diphtheriae as a causative agent—combines with the secondary infection to produce the thick, gummy, purulent necrotic material on the surface of the trachea. Contrary to the usual condition in influenzal infections the lungs are not involved in acute laryngotracheobronchitis. Examination of the lungs reveals infective bronchitis but no bronchopneumonia. The symptoms, signs and treatment are fully discussed. The factors which have contributed to the improved outlook at the present time are: (1) recognition of acute laryngotracheobronchitis as a clinical entity; (2) early relief of laryngeal obstruction by tracheotomy; (3) saturation of the inspired air with moisture, and (4) the use of the bronchoscope to overcome bronchial obstruction.

GONCE, Madison, Wis.

INDICATIONS FOR TONSILLECTOMY: A GENERAL PRACTITIONER'S OUTLOOK. B. EPSTEIN, South African M. J. **18**:59 (Feb. 26) 1944.

Epstein feels that operations for the removal of tonsils are too often performed without adequate cause. He has frequently observed the failure of tonsillectomy to protect against the initial attack or the recurrences of rheumatic fever. The operation affords no relief from allergic rhinitis. Enlargement of the cervical lymph nodes in children is no indication for removal of the tonsils; the enlargement may be part of a generalized physiologic glandular enlargement or may be due to a virus infection. Definite indications for tonsillectomy and adenoidectomy are: (1) repeated sore throat; (2) peritonsillar abscess; (3) mechanical obstruction to breathing, and (4) recurrent attacks of otitis media or abscess of the middle ear in children. The operation is not without risk. The anesthetic occasionally causes death. Psychic trauma frequently follows the operation; bed wetting, irritability, insomnia and nightmares in children can often be traced back to exposure to an anesthetic. Bronchiectasis due to inhalation of infected material after tonsillectomy occurs in a not inconsiderable number of instances. The advisability of the creation of "tonsil consciousness" in parents by school nurses is open to question.

GONCE, Madison, Wis.

Diseases of Lungs, Pleura and Mediastinum

THE RELATIONSHIP OF BRONCHIAL ASTHMA (AND HAY FEVER) TO PULMONARY TUBERCULOSIS. ALBERT M. TOCKER and ALEXANDER G. DAVIDSON, J. Allergy **15**:108 (March) 1944.

A group of 250 females and 136 males in the adult wards of Sea View Hospital in the city of New York were studied. The incidence of asthma and hay fever in this group of patients was essentially the same as that in the general population.

"Asthmatic symptoms tend to improve with activity of tuberculous process and to recur with the healing of the infection."

"Asthmatic seizures are a potential source of danger to the favorable course of tuberculosis."

HOYER, Cincinnati.

TREATMENT OF PNEUMONIA WITH A SINGLE DOSE OF SULFADIAZINE. HERMAN VOLLMER, CHARLES ABLER and DAVID A. ROSENBERG, J. Pediat. **24**:553 (May) 1944.

Uncomplicated pneumococcic pneumonia in children seems to respond as promptly to a single dose of sulfadiazine as to continued doses of this drug. The temperature dropped to normal in from four to ninety-six hours, or an average of thirty-eight and four-tenths hours, following the single dose, and in from six to one hundred hours, or an average of forty and one-tenth hours, when a full course of sulfadiazine was given. No toxic manifestations appeared in 25 children after a single dose of from 0.15 to 0.3 Gm. of sulfadiazine per kilogram of body weight, not exceeding a maximal dose of 5.0 Gm. of sulfadiazine. The urine of these children was not alkalized by administration of sodium bicarbonate.

Three patients with pneumonia complicated by otitis media did not respond to the single dose treatment.

The single dose treatment is simpler and less expensive and may decrease the risk of toxic manifestations and the sensitization to the drug; it is not recommended for hospitalized patients or for persons with serious or complicated pneumonia but may be used in ambulatory patients or cases in which proper care is lacking.

VOLLMER, New Y

CONGENITAL ABSENCE OF A LUNG, DIAGNOSED BEFORE DEATH. E. R. DEWEESE and JOHN C. HOWARD, Radiology **42**:389 (April) 1944.

A boy aged 6 months was admitted to the hospital with a cold, a cough and some cyanosis of eight days' duration. A diagnosis of atelectasis of the right lung was made. A roentgenogram of the chest showed the right lung blotted out, with the mediastinal shadows shifted to the right of the spine. The intercostal spaces were definitely narrowed on the right, and there was hyperaeration of the left lung. The right main bronchus appeared closed as viewed with the bronchoscope. Death occurred three days after the patient's admission, and necropsy revealed complete absence of the right lung.

The authors bring the record of instances of this defect up to date by giving a brief summary of 7 cases from recent literature, making with theirs a total of 44 cases. The patients varied in age from 1 to 40 years.

ANSPACH, Chica

Diseases of the Gastrointestinal Tract, Liver and Peritoneum

SUBLINGUAL GRANULOMA IN INFANCY (RIGA-FEDE DISEASE). MASON ABRAMSON and JAMES O. DOU, J. Pediat. **24**:195 (Feb.) 1944.

Two cases of Riga-Fede disease, granuloma of the frenulum linguae following abrasion by the lower central incisors and secondary infection, are reported. Excision of the tumor resulted in prompt recovery in both cases.

FROM THE AUTHORS' SUMMA

ENTERO-ENTERIC INTUSSUSCEPTION. C. ALLEN, Radiology **42**:122 (Feb.) 1944.

Intussusceptions can be classified as colocolic, ileocolic (including ileocecal) and enteroenteric according to whether they involve the colon, the ileum and colon in the region of the ileocecal valve or the small intestine alone. The enteroenteric type accounts for approximately 14 per cent of the total number of cases. The most common type, ileocolic, is seen most often in infants less than 2 years of age and usually is characterized by sudden onset. Enteroenteric intussusception, on the other hand, is frequently a disease of adults and is often chronic. The most common cause is tumor, either benign or malignant, and the second most frequent is invagination of Meckel's diverticulum. Among other lesions which have been reported as causes of enteroenteric intussusception are enlargement of the mesenteric lymph nodes, ulceration of a Peyer patch, stenosis and adhesions.

Whereas the symptoms of acute ileocolic intussusception in infants usually are characteristic, that of chronic enteroenteric intussusception in adults frequently is atypical and bizarre. "It is just in this type (enteroenteric) that help is most needed; for the appearance of blood in the stool is a late occurrence, and the tumors being small are often not palpated."

In roentgen studies of persons with enteroenteric intussusception obstruction to retrograde filling is almost always met, but the site of obstruction may re

e face of the advancing enema. A mass that
des with the site of obstruction and recedes with
requently palpable. After evacuation of the enema,
nass and the site of obstruction may be found to
advanced again. This change in position is due
e fact that intussusception tends to be reduced and
cur as a result of the action of peristalsis and of
hanging pressure within the bowel.

e chief roentgenologic characteristics of this con-
after the administration of a suspension of barium
e by mouth are (1) gradual narrowing of the lumen
e bowel as it approaches the intussusception, (2)
le narrowing of the lumen through the intussuscep-
nd (3) retrograde filling of the space between the
usceptum and the intussuscipiens, with formation
characteristic "concentric ring" or "spiral sheath."
lpable mass is present at a position coincident with
of the filling defect in the column of barium.

teroenteric intussusception usually is secondary to
other lesion of the bowel, but the roentgenologist
dom able to identify the primary lesion even after
s recognized the intussusception.

ANSPACH, Chicago.

Nervous Diseases

RESSIVE MULTIFORM ANGIOSIS. SILVANO ARIETI
d EDWARD W. GRAY, Arch. Neurol. & Psychiat.
:182 (Feb.) 1944.

e authors report the case of a man who died at
ars of age with progressive multiform angiosis,
had no abnormal neurologic signs until he was 54
of age. The patient had severe chronic alcoholism.
was found to have a cerebral angioma, diffuse vas-
abnormalities in the brain, an aneurysm of the
of Willis and an aneurysm of the abdominal aorta.
lesions indicated congenital malformation of the
ls. The term "progressive multiform angiosis" is
ested for this condition.

BEVERLY, Chicago.

AMINIC CEPHALGIA. L. W. SWANSON, J. Allergy
5:144 (March) 1944.

case of headache due to histamine is reported in
n nausea and vomiting were associated. There was
neous sensitivity to histamine.
staminase administered orally elicited a favorable
nse.

HOYER, Cincinnati.

NCES IN THE CHEMOTHERAPY OF INFLUENZAL
ENINGITIS. M. L. BLUMBERG, E. TANNENBAUM
nd M. GLEICH, J. Pediat. **24**:182 (Feb.) 1944.

fore the advent of chemotherapy the mortality rate
influenzal meningitis was 95 to 100 per cent. The
of sulfonamide compounds and serum has reduced
to about half.

om January 1936 to June 1943 there were 11
nts with influenzal meningitis at Harlem Hospital
ew York. Their ages ranged from 10 months to
years. They were all treated with sulfonamide
ounds, and 6 patients were given influenzal anti-
n intrathecally, intravenously or by both routes.
e patients were treated with sulfadiazine, supple-
ted for 1 patient with influenzal antiserum. A total
½ grains of sodium sulfadiazine per pound of body
ht (0.18 Gm. per kilogram), as a 5 per cent aqueous
ion, in divided doses was administered every four
s beginning four hours after the initial dose, which
one half of the total daily dose. Intravenous therapy
was continued until definite improvement was noted, and then the drug was given orally. After ten to fourteen days of therapy the dosage was reduced, and finally administration of the drug was discontinued. Of 7 patients treated with sulfapyridine or sulfadiazine only 2 died. Two patients treated with sulfadiazine were the only ones who recovered without receiving serum. In all, 6 patients died, while 5 (45.4 per cent of the series) were cured and showed no complications.

BLUMBERG, New York.

VOGT'S SYNDROME. ALEJANDRO J. PETRE, Arch. argent. de pediat. **21**:231 (March) 1944.

Seventy-eight cases of the Vogt syndrome among patients who attended the Children's Hospital, Buenos Aires, Argentina, from 1932 to 1942 are reviewed. The incidence, etiology, pathology and symptomatology are analyzed. The authors feel that there are many varieties besides the typical clinical picture, namely, the convulsive, oligophrenic and strabismic pictures. It is not uncommon to find signs of pyramidal involvement, whereon a mixed pyramidal-extrapyramidal condition is established.

CASSORLA, San Francisco.

Psychology and Psychiatry

A PSYCHIATRIC CONSULTATION SERVICE IN A PEDIATRIC OUTPATIENT DEPARTMENT. MABEL HUSCHKA, J. Pediat. **24**:206 (Feb.) 1944.

The experience of a child psychiatrist working as a consultant in a pediatric outpatient department for six years is reported. Referral procedures, therapy and recording are discussed; in connection with the latter the importance of using nontechnical language is emphasized. Overzealous promotion of the value of psychiatry is warned against, as it leads to ultimate disappointment for the pediatrician. A positive result of the service is the increased incorporation of psychiatric principles in pediatric management by some physicians, but until results are accurately evaluated caution is advised in drawing conclusions as to achievements.

The author's suggestions for establishing a service for psychiatric consultation in a pediatric clinic include discussions of the relationships of the departments of pediatrics and psychiatry, the importance of defining goals and the criteria for selection of patients to be referred for consultation. It is recommended that at first the service be limited to preschool children. The importance of distinguishing between the children needing social service and those requiring the psychiatrist's care is presented.

Referral made on the basis of the presence of psychologic symptoms rather than the absence of physical signs clarifies thinking and expedites service. More profitable use of the psychiatrist's time will be secured if preference is given to patients with a good therapeutic outlook; the child whose mother has psychologic obstructions against making use of psychiatric help is unfavorable for referral if service is limited. Preparation of both mother and child for the psychiatric appointment is an important responsibility of the referring pediatrician. Probably the availability of funds and the resultant too rapid promotion of child psychiatry with emphasis on detection of pathologic conditions is partly responsible for the present dilemma in which a great many patients are recognized as needing psychiatric care, but a disproportionately small number of patients are ready to accept it, and a disproportionately small number of therapeutists are available to give it. The

discrepancy would not be so great if child psychiatry had developed at its own pace.

The report includes a brief summary of undertakings which were by-products of the clinical work. These included collaboration in the writing of a manual for pediatricians and in the modification of procedures in the prophylaxis clinic in order to reduce stimulation of the children's anxieties. Also, after experimentation, a method of obtaining and recording psychiatric histories was worked out which facilitated analysis of the dynamics of the children's behavior. When it became apparent that the method was building up a volume of material of significance, studies of the data were made from time to time; four of these studies are briefly reviewed.

The study of threatened punishment for masturbation revealed that 40 per cent of 320 children were dealt with destructively in this respect. Often the child was specifically threatened with genital injury. This factual information corroborates the freudian concept of "castration threat," but, contrary to Freud's theory, it was not the father who was the "castrating" agent but the mother.

In studying the mothers of problem children it was found that of 488 children 41 per cent had mothers suffering from psychopathologic disorders. The wisdom of referring such mothers to social workers, as was so often done in the past, is therefore questioned.

Investigation of the child's response to coercive training in control of defecation disclosed that training was usually started much earlier than was desirable from the point of view of the child's total development and that frequently the child's response was in reactions through which neurosis expresses itself. In a brief survey in the well baby clinic a higher incidence of well adjusted mothers was found than in the clinic for problem children, but there was an unexpectedly high incidence of unhealthy adaptation of the babies due to unwholesome management by poorly adjusted mothers. This indicates that the application of further knowledge regarding the management of the psychologic aspects of infancy is one of the present frontiers in pediatrics.

The paper closes with a brief discussion of experimental teaching in the department of health of Cornell University Medical College and of postgraduate teaching in a department of public health.

HUSCHKA, New York.

Diseases of the Genitourinary Tract

EPHEDRINE SULFATE IN THE TREATMENT OF NOCTURNAL ENURESIS. W. E. KITTREDGE and HARRY G. BROWN, New Orleans M. & S. J. **96**:562 (June) 1944.

The authors report satisfactory results in treating nocturnal enuresis with ephedrine sulfate. After organic causative factors had been ruled out, the patients were given ⅜ grain (22.5 mg.) of ephedrine sulfate at bedtime. Results are usually promptly achieved, but some patients require treatment for considerable time. Failures do occur for reasons which are not obvious. In case of failure larger doses of ephedrine do not help.

BERKLEY, Beverly Hills, Calif.

ROENTGEN THERAPY OF WILMS' TUMOR. EDWARD W. ROWE and MAURICE D. FRAZER, Radiology **42**:107 (Feb.) 1944.

The Wilms tumor, adenomyosarcoma, or embryonal mixed tumor of the kidney, is the most common renal neoplasm occurring in infants and children. The fa triad of symptoms of renal neoplasm, hematuria, and a mass, is not observed in all cases of Wilms t The usual symptom is a rapidly growing mass. patient is usually a child 3 to 5 years of age, fairly nourished and in apparent good health. A ma varying size, smooth contour and firm consistency, moves on deep inspiration, is present in either Other abdominal tumors encountered in children may lead to some confusion in differential diagnos medulloblastoma of the adrenal glands, retroperi sarcoma, intestinal lymphosarcoma, congenital ren normalities, mesenteric and pancreatic cysts and s megaly associated with leukemia or lymphoblastom

Complete roentgenographic and urologic examina of the urinary tracts of these patients is definitely cated. Exposure of the tumor by aspiration is condemned because of the danger of spreading anaplastic growth.

In pyelograms taken after intravenous administr of the dye one will note several changes on the af side: (1) delay in appearance of the dye, (2) dista of the renal pelvis and calices by the tumor, (3) m displacement of the ureter and (4) displacement renal pelvis and calices, the direction and degree de ing on the location of the tumor and its size.

The authors concluded (*a*) that tumors may orig at different periods in the development of the em (*b*) that the renal blastema or nephrotome is a dominant contributing structure, and a tumor a which establishes itself at the time the nephroto formed will elaborate tissue easily recognized as in origin and (*c*) that a tumor anlage which sepa earlier, before the formation of the nephrotome, h larger number of possibilities for elaborating mu tumor cells, which may account for the presen muscle fibers and other tissues in the tumor.

The tumor is usually well demarcated and surrou by a fibrous capsule that infiltrates somewhat into renal substance. Wilms tumors vary greatly in and shape. They may be firm, smooth, lobulate cystic. The most common sites of metastases are liver, lungs and bones.

Four cases of renal tumor in children are prese In 1 case the growth was treated by surgical rem and postoperative irradiation, and in the other 3 operative irradiation, surgical removal and postoper irradiation were used. The first patient died within months. The remaining 3 had survived four and t quarters years, two years and seven months at the of the report.

Combined preoperative irradiation, surgical inter tion and postoperative irradiation offers the most s factory method of treatment in these cases for physicians.

Irradiation should be used as an adjunct to surg intervention and not as the sole treatment for tumor this type.

ANSPACH, Chica

KIDNEY TUMORS. WILLIAM E. HOWES, Radiology 319 (April) 1944.

The classification, pathology and diagnosis are bri discussed. The material consisted of records of 54 tients (0.65 per cent) from among 6,400 admitted to Brooklyn Cancer Institute. Five patients had Wi tumors. In the other patients, whose ages varied i 9 to 79 years, cortical tumors were the most com Absence of early symptoms was the outstanding cha teristic. Diagnosis was usually late, when calices

formed on roentgenograms. In 29 cases the first sign s pain, in 21 cases hematuria, in 4 cases palpation of mor. Only 11 of the patients are still living, and only had no known metastasis. Thirty-eight had nephrecmies, and all but 5 showed metastases within three ars. Of 5 still living, 4 were listed as having papilry carcinomas and 1 as having an alveolar carcinoma. The author states that many of these tumors were diosensitive. Prenephrectomy roentgen therapy is oretically worth while if it will reduce the size of tumor and so injure the tumor that it is unable to tastasize. Metastases are generally radioresistant.

ANSPACH, Chicago.

Diseases of the Ductless Glands; Endocrinology

FFECT OF ADRENOCORTICOTROPIC HORMONE ON THE ANTERIOR PITUITARY OF THE NORMAL YOUNG MALE RAT. ALEXEI A. KONEFF, Endocrinology **34**:77 (Feb.) 1944.

Previous studies with purified adrenocorticotropic rmone revealed that chronic administration of this terior pituitary principle to immature male rats has e following effects: (*a*) hypertrophy of the adrenal rtex; (*b*) atrophy of the thymus gland and lymph des; (*c*) retardation of body growth; (*d*) retardation the development of the testes and the male accessory gans, and (*e*) decrease in the weight of and some poplasia in the thyroid. In this paper the effects the pituitary gland of prolonged administration of re adrenocorticotropic substance are described. The terations consisted in a decrease in the weight of the and, a diminution in the size of the basophilic cells d morphologic and cytologic changes which can be aracterized as being indicative of depressed or rerded function.

JACOBSEN, Buffalo.

FLUENCE OF THE THYROID GLAND ON PITUITARY GONADOTROPHIC ACTIVITY IN THE RABBIT. J. P. CHU, Endocrinology **34**:90 (Feb.) 1944.

It appears that the hypophysis of thyroidectomized bbits is free of substances stimulating ovulation, hereas the amount of follicle-stimulating hormone may considerably increased.

JACOBSEN, Buffalo.

MPORTANCE OF THE FEMALE REPRODUCTIVE TRACT IN THE FORMATION OF RELAXIN. FREDERICK L. HISAW, M. X. ZARROW, W. L. MONEY, R. V. N. TALMADGE and A. A. ABRAMOWITZ, Endocrinology **34**:122 (Feb.) 1944.

The remarkable loosening of the pelvic ligaments hich occurs at both the symphysis pubis and the iliocral junctions in the pregnant guinea pig has been served and described by numerous investigators. hese separations become so extensive as pregnancy rogresses that a condition is attained in which the two lves of the pelvis can be freely and independently anipulated; this makes possible an increase in the ameter of the birth canal. Pronounced relaxation of e pelvis can be induced experimentally by injecting ood serum from pregnant rabbits or guinea pigs into rmal virgin guinea pigs during estrus or into castrated male guinea pigs previously conditioned with estrogen. he pelvic ligaments usually show distinct relaxation ithin eight to twelve hours after one injection of the rum. The relaxative substance has been found also in the blood of pregnant sows, dogs, cats and mares, in extracts of the placentas of rabbits and in the corpora lutea of sows.

This investigation deals with the action of estrogen, progesterone and relaxin in experimental relaxation of the pelvic ligaments of guinea pigs. It is concluded that relaxin acts as a specific hormone, directly responsible for this reaction. Progesterone did not produce relaxation in castrated, hysterectomized guinea pigs, while the absence of the ovaries and uterus had no effect on the response to relaxin. It appears that the female reproductive tract is essential for the formation of relaxin in response to progesterone. Estradiol stimulated the formation of relaxin in castrated female rabbits but not in castrated, hysterectomized females or in castrated males.

JACOBSEN, Buffalo.

INHIBITION OF METAMORPHOSIS IN TADPOLES BY THIOURACIL. A. M. HUGHES and E. B. ASTWOOD, Endocrinology **34**:138 (Feb.) 1944.

It was found that thiouracil in a concentration of 1:2,000 inhibited the metamorphosis of Rana clamitans ordinarily induced by injections of an anterior pituitary extract containing the thyrotropic factor. Since the action of thyroxin in inducing metamorphosis is not inhibited, it is believed that the drug prevents the production of thyroid hormone.

JACOBSEN, Buffalo.

IMMUNOLOGIC STUDIES IN INSULIN RESISTANCE. I. REPORT OF A CASE EXHIBITING VARIATIONS IN RESISTANCE AND ALLERGY TO INSULIN. FRANCIS C. LOWELL, J. Clin. Investigation **23**:225 (March) 1944.

Studies on a 50 year old diabetic woman who displayed considerable resistance to insulin associated with a high degree of allergy to insulin yielded evidence that the resistance to insulin was immunologic in nature and that the allergy and the resistance varied independently of each other during attempts at desensitization. It is postulated that two immune systems may have been involved, namely, the skin-sensitizing mechanism associated with urticaria, etc., and an insulin-neutralizing antibody for insulin, which was responsible for the patient's resistance to insulin.

GUEST, Cincinnati.

IMMUNOLOGIC STUDIES IN INSULIN RESISTANCE: II. THE PRESENCE OF A NEUTRALIZING FACTOR IN THE BLOOD EXHIBITING SOME CHARACTERISTICS OF AN ANTIBODY. FRANCIS C. LOWELL, J. Clin. Investigation **23**:233 (March) 1944.

Tests on a number of samples of serum from 2 insulin-resistant diabetic patients showed that the presence of insulin-neutralizing activity in the serum was associated with resistance to insulin. The factor in the serum of 1 patient exhibited species specificity against insulin preparations of different animal origin.

GUEST, Cincinnati.

THE THYROID GLAND AND HAEMOPOIESIS. T. E. WILSON, M. J. Australia **1**:261 (March 25) 1944.

From the results of his clinical and experimental studies on rats, Wilson concludes that the thyroid gland exercises a nonspecific control of the metabolism of all the marrow cells, resulting in their hyperplasia (which was not reflected in the peripheral blood) in thyrotoxicosis and in their hypoplasia in cretinism and myxedema.

GONCE, Madison, Wis.

Skin Diseases; Allergy

DERMATITIS DUE TO SHOES. CLARENCE SHAW, Arch. Dermat. & Syph. **49**:191 (March) 1944.

The author noted that dermatitis due to footwear is more common than is ordinarily believed. The eruption may be differentiated from dermatophytosis by its predilection for the large toes and the dorsa of the feet rather than for the interspaces between the toes, by the reaction to a patch test and by the absence of demonstrable fungi on microscopic examination. The patient may be relieved by changing his brand of shoes.

McINTOSH, Iowa City.

BLOOD STUDIES IN ALLERGY: I. THE DIRECT COUNTING CHAMBER DETERMINATION OF EOSINOPHILS BY PROPYLENE GLYCOL AQUEOUS STAINS. THERNON G. RANDOLPH, J. Allergy **15**:89 (March) 1944.

A few drops of a solution containing 0.1 per cent methylene blue (methylthionine chloride) in 50 cc. of propylene alcohol and 50 cc. of distilled water is mixed with a few drops of a solution containing 0.1 per cent phlopine in propylene alcohol 50 cc. and distilled water 50 cc.

This solution is used as a diluent in counting eosinophils in the counting chamber when the total leukocyte count is being made. The diluent is usable approximately four hours after mixing.

This direct method of counting eosinophils has advantages over the indirect method.

HOYER, Cincinnati.

THE ADMINISTRATION OF NICOTINIC ACID AND CALCIUM LACTATE IN URTICARIA. DORRIS COSS CHAMBERS and HARRY S. BERNTON, J.Allergy **15**:141 (March) 1944.

Gratifying results were obtained in 15 cases of urticaria by using 20 mg. of nicotinic acid twice a day with meals and 5 grains of calcium lactate three times a day with meals.

HOYER, Cincinnati.

ALLERGY TO ODOR OF WHITE POTATO (IRISH POTATO). ARTHUR J. HORESH, J. Allergy **15**:147 (March) 1944.

A young child whose skin was shown to be sensitive to white potato would have asthma whenever in the presence of potatoes.

Relief was given him by removal of potatoes from the home.

HOYER, Cincinnati.

ACRODYNIA IN A THIRTEEN-YEAR-OLD BOY. KATHE... ANDERSON, J. Pediat. **24**:186 (Feb.) 1944.

The author reports a case of acrodynia in which ... patient was a 13 year old boy. The diagnosis was ba... on tachycardia, hypertension, pains of a migratory ... ture and sensations of itching and burning. Before ... appearance of intense itching and burning of the ha... and feet and of typical cutaneous lesions, the patie... behavior and unsystematized complaints, together w... his agitated mental state and despondency, suggested ... functional disorder. Persistent hypertension, howe... made a diagnosis of psychoneurosis untenable. For ... time all of his symptoms and signs seemed consis... with sympathetic imbalance such as an epinephri... producing chromaffin cell tumor may cause. The pati... experienced headache, loss of weight and emotional d... turbances, which occur fairly constantly in persons w... these tumors. The "smothering spells" which were ... prominent feature of the boy's illness simulated p... oxysmal sympathicotonia due to paraganglioma, w... sensations of precordial constriction and suffocati... flushing of the skin, anxiety, diffuse pains and profu... perspiration. Because of the similarities in the clini... picture a tentative diagnosis of pheochromocytoma w... made for this patient and adrenal exploration w... planned. It was not until three months after the on... of the illness that intense burning and itching of t... hands and feet, suggesting acrodynia, developed. Typi... cutaneous lesions, with noticeable redness, succulen... and desquamation, did not appear until the fifth mon... of the disease. The diagnosis was further confirm... by the complete recovery which ensued ten months af... the onset of the disease.

Acrodynia, which is commonly a disease of infan... and early childhood, does occur in older children a... in adults. Emotional disturbances are a prominent fe... ture of the illness in older persons. The main differe... in the disease in infantiles and adults seems to lie ... the more vociferous expression of complaints and t... wider patterns of reaction of older patients. When t... characteristic burning, itching and redness of the e... tremities appear late in the disease, only tachycardia a... hypertension serve to distinguish acrodynia from a fu... tional disorder, and the clinical picture may simula... that of paraganglioma. ANDERSON, Nashville, Tenn.

TORANTIL (HISTAMINASE) IN URTICARIA FOLLOWI... SERUM ADMINISTRATION. JOHN A. TOOMEY, Fra... ERIC M. KRIETE and HAROLD C. EPSTEIN, J. Pedi... **24**:290 (March) 1944.

Histaminase (a preparation manufactured under t... trade name "torantil") was used for urticaria th... followed the administration of meningococcus hor... serum antitoxin. This material neither prevented n... ameliorated the serum sickness. TOOMEY, Cleveland.

Society Transactions

HICAGO PEDIATRIC SOCIETY AND CHILDREN'S DIVISION OF COOK COUNTY HOSPITAL

MAURICE L. BLATT, M.D., *President of the Pediatric Staff, in the Chair*

Joint Meeting, Dec. 21, 1943

ect of the War on Pediatrics in Chicago and in Cook County Hospital. DR. MAURICE L. BLATT.

cannot open this meeting without calling attention the loss of a most valued member and friend, an president of this society, Dr. Henry E. Irish. Dr. sh was one of the most beloved men on the staff of ok County Hospital for many years and was a con- nt worker. Although he knew his health was not d, he continued to work. He gave a great deal by charming personality and broad clinical experience. Many men who were trained in pediatrics here are w far afield. They are having their education broad- d in a manner that would not have been possible d they gone directly into practice. They will be ter research men and better physicians because of s experience. Those of us who remain are caring our own practices and for those of the men who ve gone into service, and, so far as we can, we are ping their practices intact. We have their records; ir patients call us for information, and when they in need of medical care we respond. We think that se who are absent will be able to resume their prac- es when they reopen offices.

The increase in office consultations has been tremen- us. The need for advice by telephone has increased rmously, and this phase of the physician's work must done between 6 and 8 p. m., not during office hours. e spends less time in charitable institutions—if one nds six hours per week one is doing well—and there much less time for research.

There are fewer patients in charity hospitals; in this ilding there are at least 100 fewer patients than there re a year ago. Many people take care of themselves; ny go to private hospitals at their own expense or der hospitalization insurance.

The results of prophylactic treatment are beginning be evident, and the sulfonamide drugs have helped.

The institutes and orphanages have more children. ore illegitimate children are born. Numerous chil- en are brought into institutions for care over week- ds, because parents go out for a celebration on Satur- ys, leaving young children alone in the house.

Medical residents are going into service one after other, but I think that the immediate medical needs e being met.

An interesting change has occurred in the collection mothers' milk. In the past the needed amounts could obtained, but now they cannot. Women earn so uch money in war work that they quit nursing their ildren and coming to us to donate milk. As a result e death rate among premature infants is increased. I think these are the important effects of war on diatric practice in Chicago.

Tracheobronchitis. DR. ARCHIBALD L. HOYNE.

Tracheobronchitis is one of the serious conditions seen by pediatricians from time to time. Most patients with this condition are less than 3 years of age. They are usually admitted to contagious disease hospitals for intubation to relieve laryngeal stenosis. Tracheobronchitis must be differentiated from diphtheria in these cases. There are facts of special interest in connection with the causation of tracheobronchitis. A few years ago the disease was unusually prevalent; it appears to come in epidemics, and a question is often raised in regard to the organism which may be responsible. I believe that tracheobronchitis frequently begins with infection of the larynx with influenza bacilli. Attention has been directed to this causative factor on a number of occasions, although commonly some thought is given to the hemolytic streptococci or other organisms.

In regard to treatment, which is the primary concern, it is frequently necessary to adopt immediately some method of relieving the impending asphyxia, which is ordinarily the cause of death. Many times it must be determined whether intubation or tracheotomy shall be undertaken, and the decision must be made quickly or the patient is lost. In contagious disease hospitals intubation would probably be used for most laryngeal obstructions. On the other hand, in the treatment of tracheobronchitis intubation will not as a rule be successful, because the secretions may be low in the trachea, even below the bifurcation. Moreover, intubation is likely to afford only temporary relief when there is edema in the region of the glottis, because the edema wells up over the top of the intubation tube. Tracheotomy may, however, be successful. An important advantage of tracheotomy is the possibility of passing a small catheter through the tube and resorting to repeated aspiration. In some instances aspiration is not sufficient, in which event the value of bronchoscopy is readily seen. The occluding substance may not be a thin serous secretion but a material of gummy consistency that cannot be removed by the use of a catheter or by ordinary suction. The only way to evacuate these plugs is by means of the bronchoscope. But treatment of all patients is not the same. Recovery from many of the milder attacks can be accomplished without intubation or tracheotomy. My associates and I have had a large number of children treated in the steam room. Steam is a great aid as a rule; it helps to liquefy tenacious material, making it easier to remove by suction. It is also advisable to elevate the foot of the patient's bed.

Certain treatments should not be employed. Atropine and morphine make the condition worse. The cough reflex is lost, and it is almost impossible for the child to bring up material from the respiratory passages. Therefore the airways must be kept clear by mechanical means.

A few years ago the mortality of 15 per cent at Municipal Contagious Disease Hospital was considered good. Often the mortality is 50 per cent or higher. Nearly all the patients with tracheobronchitis were sent to the hospital with a diagnosis of laryngeal diphtheria.

I believe that if Dr. Galloway were here he would concur in most of what has been said. I feel sure nearly

every one will agree that tracheotomy is the proper form of treatment for tracheobronchitis if surgical measures are required.

Pulmonary Cysts. DR. W. RAYCRAFT.

A Mexican boy was born on June 14, 1943, at Michael Reese Hospital. He remained there about two months with impetigo and furunculosis of the scalp. He was admitted to the children's division of Cook County Hospital on Oct. 30, 1943, with multiple lesions of the scalp and an abscess of the right thigh. He was not acutely ill. The temperature was never high. Culture of the blood and a Mantoux test gave negative results. The scalp was covered with scars and boils, and there was a flocculent abscess on the right thigh. Treatment consisted of administration of sulfathiazole by mouth and application of hot wet dressings and of sulfathiazole ointment on the scalp. The abscess was drained. The patient is now in reasonably good condition except for the pulmonary cyst shown on roentgenograms; he is thriving and is fairly comfortable. The cyst is apparently becoming larger.

In the second case presented the child had multiple pustules and otitis media. Autopsy showed cysts throughout the entire lung.

In both cases there was a history of multiple abscesses. Whether there is a relationship between the primary cutaneous infection and the development of the pulmonary cyst is hard to say. Possibly a cyst occurs because of an infection and low resistance, and the patient has no chance from the start. On the other hand, cysts may be congenital, developing from stenotic bronchioles.

There is no satisfactory treatment for this condition. Sometimes air is aspirated, as was done in the second case, with not too good results; sometimes a portion of the lung is removed. The cysts have a tendency to grow during childhood, preventing the exit of air, and they may grow sufficiently to fill the thorax.

Erythroblastosis Producing the Picture of Obstruction of the Biliary Tract. DR. PHILIP L. ARIES.

The conclusion that could be drawn from a study of the case I am presenting and 5 other cases observed at Cook County Hospital is that hemolytic anemia may present the picture characteristic of obstructive jaundice.

An 8 day old male infant had become progressively jaundiced since the third day of life. Normal-looking meconium was passed for the first three days, after which the stools became lighter in color; on the eighth day they were clay colored. There were 2 older siblings with no history of jaundice.

Physically the baby was well developed. The liver was palpable 1 inch (2.5 cm.) below the costal margin in the right nipple line. The spleen was not palpable. Studies of the blood showed that the hemoglobin content was 39 per cent, the erythrocyte count 1,500,000 and the leukocyte count 30,500. There were 177,000 platelets per cubic millimeter, and the icteric index was almost 150. The stools contained no bile or urobilin. The urine was brownish green; it gave a strong reaction for bile but did not contain urobilin. A diagnosis of congenital atresia of the biliary passages was made. A transfusion of 100 cc. of matched, typed blood from the father was given on the tenth day and an equal amount the following day. The number of red cells per cubic millimeter rose to 7,000,000 and the content of hemoglobin to 110 per cent.

An exploratory operation showed that the gallbladder, cystic duct and common ducts were present; they could be demonstrated roentgenographically by injecting a drast compound solution into the gallbladder. Roentgenograms made immediately revealed the dye in the duodenum. The hepatic ducts, however, were not visualized. The material in the gallbladder was highly colored and viscid. The gallbladder was drained by the use of a rubber tube, and the organ was irrigated daily with isotonic solution of sodium chloride. The material first drained from the gallbladder did not contain bile until forty-eight hours after the operation. The stools did not contain bile or urobilin for the first three days. The urine continued to react positively to tests for bile for four days; no urobilin was found in the urine until the fifth postoperative day.

After the operation complete studies revealed that the blood of the infant and father was Rh positive and that of the mother Rh negative. The infant recovered; the jaundice cleared up after several weeks. The child is now 5 months old and is doing well.

The obstructive phenomena were due to inspissated bile in the biliary capillaries and ducts. This material is excreted in excessive amount, because of the exaggerated hemolysis, in newborn infants with erythroblastosis or sickle cell anemia.

Staphylococcic Septicemia. DR. JOSEPH GREENGARD.

This baby was born in the obstetric ward of Cook County Hospital on June 5. She was transferred to a home for foundlings nearby and was brought back to us at the age of 12 days because of fever of unexplained origin and the possibility that she might have an intracranial injury. The temperature was 102 F., but there were few physical symptoms of significance. On the following day the child looked sick, although the temperature was down. The left external auditory canal was filled with pus, and the nasopharynx was injected. The right ear drum was normal, but the left could not be visualized. The administration of sulfathiazole in large doses was instituted at once. A spinal puncture done that day showed that the fluid was clear. The reaction to the Pandy test was faintly positive. There were 48 cells per cubic millimeter, mostly polymorphonuclear leukocytes, but no organisms were found in smears or cultures.

The left ear continued to discharge. Four days after the infant was admitted to the hospital a swelling appeared in the region of the left parotid gland and developed to about the size of a golf ball; it was hot, apparently exceedingly tender and fluctuating. The condition was considered to be suppurative parotitis. Aspiration yielded 2 cc. of pus; the mass was incised and drained. The same day a tender, red swelling appeared on the left index finger; this was also incised. The abscesses appeared suddenly, with rapid suppuration.

On the eighteenth day of life the infant was pale, respiration was rapid, and there were many rales and dulness in the right infraclavicular area and in the posterior portion of the chest. The spleen was not palpable; the liver was about 2 fingerbreadths lower than normal. A diagnosis of sepsis of the newborn was made; the portal of entry was the nasopharynx and middle ear and there were multiple metastatic abscesses. Treatment with large doses of sulfathiazole was continued; the child was given blood and pooled human serum intravenously. When the culture of blood showed the presence of Staphylococcus aureus, 20,000 units of staphylococcus antitoxin were given intravenously.

days later a large mass developed suddenly in the xillary region and spread over the scapular region, ng a more or less continuous soft tissue abscess ding to the axilla. Pus was obtained on aspiration. ncision was made posteriorly, and the abscess was ed.

that time roentgenograms revealed interesting con- s in the bones and in the right lung. The diag- of multiple osteomyelitis was then apparent. More ylococcus antitoxin was given, and the sulfathiazole replaced by sulfadiazine. The course was stormy hree or four weeks; then some improvement began, has continued. A great many cultures of blood made—ten or twelve in all—and a hemolytic strain taph. aureus was consistently isolated. The same nism was grown from the pus from all abscesses d and from the original aural discharge.

present this child, who is comfortable and acts ally, still has a bacteremia with this virulent germ. is still taking large doses of sulfadiazine, which been administered for six months with no deter- ble deleterious effect.

ere are several striking features of this case. The is the development of multiple areas of osteomye- one in the left scapula, with severe destruction, n the right fifth rib and one in the left index finger. e areas were treated conservatively with sulfon- e drugs and general supportive measures, with sur- intervention confined to the evacuation of soft abscesses; direct manipulation of the bone was ulously avoided. The excellent local result favors method. The severe destruction of the scapula and xcellent reconstruction are remarkable, although al sequestrums are present which may require surgical treatment. The recovery of this newborn t from septicemia with hemolytic staphylococci is uted largely to the treatment with sulfonamide ounds, though the organism can still be cultured ease from the blood. The long-continued adminis- n of sulfadiazine in large doses has shown no us unfavorable effect.

sions into Tibial Bone Marrow: Preliminary eport. DR. HERBERT D. ARBEITER.

e material presented should not be construed as or conclusive. A larger series and a longer follow- eriod are necessary before conclusions can be drawn. apparent, however, that infusions into tibial bone ow will prove of value in the treatment of war ies. Shock, with peripheral vascular collapse, and s producing large denuded areas make the use of na of prime importance and the problem of intra- us transfusion difficult. Experimentally it has been d conclusively that substances injected into the marrow are absorbed as rapidly as those introduced venously.

to Dec. 21, 1943, I have attempted twenty-eight marrow infusions in 23 patients, with a total of y successes, six failures and two partial failures, bout 71 per cent complete success. Of the 23 nts 19, or 83 per cent, were given transfusions ssfully. Three attempted transfusions for 1 patient, in the tibia and one in the femur, were unsuccess- Later it was discovered that this patient had litic osteochondritis. Autopsy revealed a yellow, ular, abnormal marrow. Two attempts to give fusions to a patient with exceedingly fat legs were cessful. The other complete failure was also in ttempted transfusion for a patient with fat legs; midline was apparently missed and the marrow cavity not entered. An attempted transfusion of whole blood into the other tibia was only partly successful; only 100 of 150 cc. was transfused during thirteen hours.

Forceful injection of fluid into bone marrow is usually associated with an outcry of pain from the patient. However, during infusion by the drip method all the patients fell asleep. In no instance were any ill effects noted. There was no evidence of infection; many of the children were receiving sulfonamide drugs at the time, which might have a bearing on the absence of infection. Two cases of osteomyelitis occurring elsewhere have been called to my attention. Certainly bone marrow infusions should not be administered to patients with osteomyelitis, pyogenic septicemia or syphilitic osteochondritis.

The youngest patient in this group was 2 days old and the oldest 3 years.

It is concluded that infusions into the tibial bone marrow are worthy of further investigation, especially in acute pediatric emergencies in which a quick technic for rapid absorption is required.

Chronic Gingivostomatitis. DR. M. BOROVSKY.

I showed you this child in December 1942. You may recall that she entered the hospital in March 1942 with a diagnosis of simple gingivitis. There was redness of the gums and the lips, and the patient appeared to have gingivostomatitis that could be treated in the usual manner and improved sufficiently in two weeks for the patient to be discharged. The course of gingivostomatitis is usually self limited no matter what treatment is given. However, this child has been in the hospital since her first admission.

Many opinions have been expressed in consultation, but there has been no conclusive decision as to the nature of the condition. At a meeting of the Chicago Dermatological Society, where the patient was shown, the members present had no statement to make as to diagnosis or possible therapy. For some time the case has presented mainly a dermatologic problem because of the spread of lesions to the neck and scalp. Roentgen ray treatments for the scalp produced total alopecia, but within five months the patient had a complete head of hair. At one time the lesions progressed down the chest and back for several inches. The skin now looks better than it has for some time.

Since October the treatment has consisted of administration of 11¼ grains (0.7 Gm.) of sulfathiazole orally every six hours and application of sulfathiazole powder locally.

There are some factors that have been noted repeatedly. Monilia has been cultured from the mouth, scalp and cutaneous lesions and from stools. An autogenous vaccine was made of the material, and the patient was given a course of therapy for two months, until the supply of vaccine was exhausted. During this period the lesions became much drier, although the tissue was firm and the condition of the eyelids was of considerable concern; the eyes were completely closed, and there was considerable secretion. The patient has always been an irritable youngster, but in the last few months she is more cooperative. In spite of the appearance of the mouth and the bleeding of the gums she does not refuse any type of food. She has maintained her nutrition well and weighs 27 pounds (12.2 Kg.) at 2½ years of age.

There has been constant eosinophilia; the proportion of eosinophilic cells has been as high as 40 to 50 per cent. By the most recent study it is 19 per cent, and otherwise the blood picture is normal. There has been

no evidence of toxicity as a result of continuous treatment with sulfonamide drugs. Because of the extension of the lesions and the presence of yeast organisms in the stool, it was thought that one of the pulmonary episodes was due to a yeast infection in the lung; the condition responded to treatment with sulfonamide drugs. I am still hoping that autogenous yeast vaccine will be of benefit. If it proves ineffective and the yeast infection may be considered merely a secondary invader, a complete study of allergic reactions is contemplated.

Sarcoidosis. DR. M. PERLSTEIN.

This 13 year old Negro girl presents an interesting history and series of symptoms. She is the sixth child in the family; her birth was normal except that the weight at birth was 4 pounds (1,800 Gm.). Development was normal. The patient's present intelligence quotient is 103. When the child was 5 years old, deformities of the arms and legs developed. The arms and fingers are long; the fingers are gnarled, and there is ulnar deviation of the wrists. The lesions are slowly progressive. The elbows can be extended only to 60 degrees. The child is small for her age.

About two years ago, three weeks before the patient was admitted to this hospital, fever and a persistent cough, productive of large amounts of whitish sputum which was occasionally tinged with blood, developed. At the time she was admitted, corneal opacities and evidence of an old iritis with posterior synechiae were found. The presence of long fingers and toes together with the ocular lesions suggested arachnodactylia. A roentgenogram of the chest clearly showed hilar infiltration suggestive of childhood tuberculosis, but the Mantoux test gave negative results with tuberculin of all strengths. The fever, which seemed to be due to an infection in the upper respiratory tract, disappeared while the patient was in the hospital.

Further roentgen studies of the long bones revealed the presence of numerous cysts that caused the deformities. In addition, there were anomalous ulnas that failed to articulate at the wrists. The bones were long and extremely slender. The Wassermann test gave a negative result. There were no cutaneous changes and no palpable lymphadenopathy. The liver and spleen were of normal size. The child seemed too well to have miliary tuberculosis (which diagnosis was made in another hospital). Other laboratory data were nonrevealing except that the total amount of protein in the blood was high (9.76 Gm. per hundred cubic centimeters), owing to a high content of globulin. The content of albumin was normal.

The patient is presented, therefore, as having a condition which is rare in children, Boeck's sarcoid. The clinical picture simulates that of tuberculosis with a repeatedly negative response to the Mantoux test, cystic changes in the bones causing deformities of the extremities, changes in the chest seen in roentgenograms and a high content of protein in the blood due to increase in the globulin fraction.

Sulfamerazine Treatment in Acute Diseases of the Respiratory Tract: Preliminary Report. DR. E. PLATTNER.

Sulfamerazine is one of the newer sulfonamide drugs, related to sulfadiazine. It is presumed to be no more toxic than sulfadiazine and has the additional features that when it is given in the same doses higher levels are attained in the blood, that it is more rapidly and completely absorbed from the gastrointestinal tract, that excretion is much slower and that it is more soluble in normal or acid urine. From these facts it is assumed that the frequency of renal damage will be lower.

A single dose of 3 Gm. will produce a level of 12 per hundred cubic centimeters of blood at the end of twelve hours and 6 mg. at the end of twenty-four hours. The urinary output in this period is only 48 per cent. The levels attained and maintained suggest slow excretion and rapid absorption. At the end of twenty-four hours the level produced by subcutaneous administration of 3 Gm. was 13.4 mg. per hundred cubic centimeters of blood. Doses given at intervals of six hours produced levels close to 14 mg. per hundred cubic centimeters of blood, doses at intervals of eight hours produced close to 12 mg. and doses twice a day (1 Gm. every twelve hours) produced a level of above 10 mg. The level in the spinal fluid was found to be one-half of that in the blood.

The following dosage has been recommended for children less than 6 months of age: initial dose 7.5 grains (0.5 Gm.), followed by doses of 3¾ grains (0.25 Gm.) every twelve hours. For children between the ages of 6 months and 3 years the initial dose is 15 grains (1 Gm.), and this is followed by doses of 7½ grains (0.5 Gm.) every twelve hours. For children between 3 and 10 years the initial dose is 22.5 grains (1.45 Gm.) and it is followed by 1 Gm. every twelve hours. For intravenous administration ⅓ grain for each pound (0.04 Gm. per kilogram) of body weight is recommended. If the child is able to take medicine, by mouth only the initial use of the intravenous route to produce the high level in the blood is recommended. For administration is oral. A recommendation is made that the level in the blood be maintained at 10 to 15 mg. per hundred cubic centimeters.

Of 45 patients with meningococcic meningitis treated with sulfamerazine, 70 per cent showed clinical improvement within forty-eight hours. Of 80 children with pneumonia, nearly 75 per cent were afebrile within seventy-two hours.

The results based on 200 cases show that 15 per cent of the patients treated with sulfamerazine have had a toxic reaction, the most common of which is microscopic hematuria. This reaction occurred in 10 per cent of the patients; 3 per cent showed gross hematuria, 3 per cent showed cutaneous manifestations; 2.5 per cent showed fever, and 1 per cent showed mental symptoms.

I have attempted the use of sulfamerazine in 54 cases of disease of the respiratory tract, giving ½ to 1 grain (0.03 to 0.06 Gm.) per pound of body weight in two to four hours. No conclusions have been drawn as yet as to what may be expected.

Attempts to Treat Tuberculous Meningitis. A. LEVINSON.

Tuberculous meningitis is known to be uniformly fatal. However, my inborn optimism coupled with the recent epoch-making discoveries that lifted purulent meningitis out of the class of fatal diseases gave me courage to try various methods of treating tuberculous meningitis. The tremendous number of patients who are admitted to Cook County Hospital has enabled me to try each method for a fairly large number. This work has been done with the able assistance of my associates, the residents, interns and nurses of my pediatric and psychiatric service. I consider this report worth while in order to save other workers in the field from trying out methods of treatment that we found of no value.

Of approximately 550 patients with tuberculous meningitis observed at the children's division of Cook Co

pital during the last eleven years, about 150 were ed by special methods. The rest received suppor- and symptomatic treatment. Among the therapeu- gents tried have been the following: intravenous inistration of hypotonic solutions with continuous l drainage; complete removal of the cerebrospinal ; insufflation with oxygen; injection of autogenous brospinal fluid; administration of typhoid vaccine; liation of the skull with roentgen rays, and adminis- on of sulfanilamide and sulfapyridine, dodecanyl nilamide, promin (sodium P,P′-diaminodiphenylsul- -N,N′-didextrose sulfonate), diasone (disodium for- lehyde sulfoxylate diaminodiphenylsulfone), vitamin nd vitamin D and calcium.

ur results have been poor. Practically all the hods used have had no influence on the recovery n the duration of the disease. Sulfanilamide and pyridine have hastened death. Eighteen patients ted with promin all died; the pathologist, however, rted some fibrosis in the lung, which he ascribed to action of the drug.

hree of our patients recovered. Two of the 3 were n large doses of vitamin D and calcium. The vita- D was usually given by mouth, and when the patient d not swallow it was given intramuscularly in doses 00,000 U. S. P. units daily. The calcium was given e form of 20 cc. of 10 per cent solution of calcium te once a day intramuscularly. The third patient recovered was treated with autogenous cerebro- al fluid.

is, of course, always hard to believe that a patient recovers had tuberculous meningitis. For a while hoped that Rich and McCordock were right in their claim that tuberculous meningitis is a result of direct extension of infection from a primary tubercle in the brain that discharges bacilli into the subarachnoid space. This would make the disease more amenable to treatment by virtue of being a local process. The work at this hospital has proved that in 95 per cent of cases tuberculous meningitis is the end result of miliary tuberculosis.

All 3 of our patients who recovered had sufficient signs to justify a diagnosis of tuberculous meningitis. Tubercle bacilli were found in the cerebrospinal fluid of 1 patient and in the stomach washings of another. Inoculation of guinea pigs proved the presence of the bacilli in the third. The cerebrospinal fluids of all three showed characteristic changes.

At the present moment I believe that treatment with high potency vitamin D preparations and with calcium administered intramuscularly deserves further study. I cannot say that the 2 patients who recovered did so because of the treatment, but I hope that it was a factor. There is at least a ray of hope in the treatment of this fatal disease.

We shall try new drugs as they are introduced on the market. We have learned, however, that it is wrong to stop supportive treatment for a condition diagnosed as tuberculous meningitis. There is always a chance that the diagnosis may be incorrect. There is no infallible chemical test for diagnosis of the disease.

No matter what drug may be used in the treatment of tuberculous meningitis, the best cure is still prevention of tuberculous infection and early treatment of tuberculosis so that it does not reach the miliary and meningitic stage.

Book Reviews

Pediatria. By Martagao Gesteira. Price, not given. Pp. 295, with 53 illustrations. Rio de Janeiro: Editorial Peixoto, S. A., 1944.

Dr. Martagao Gesteira belongs to the group of pioneers who started pediatrics as a medical specialty in Brazil. In his private practice, as well as in teaching and in planning children's welfare organizations, he has contributed definitely to the progress in the care of children which has taken place in recent years in that country.

His book is a collection of sixteen lectures or talks about pediatrics, which reflect his multiple interests and broad range of knowledge. In some of the lectures to medical students, such as those on "Directions for Therapy in Children," "The Error in Pediatric Practice" and "The Cry of the Infant," the titles themselves reveal the original and practical interest of the subjects, which are treated in a clear and didactic manner peculiar to the classical school. Other chapters contain more personal contributions to the author, such as the one about the treatment of infants having nutritional disturbances with coconut milk—the author's Brazilian version of Moll's almond milk. A complete analysis of the composition and the therapeutic effect of coconut milk is made, followed by reports of cases in which it was used with good results.

The most important part of the book consists of four lectures on poliomyelitis, which constituted a complete public course given with the intention of instructing the Brazilian general practitioner on this topic, in view of the more marked incidence each year of epidemics of this disease in Rio de Janeiro. The causation, pathologic features, various clinical pictures, prognosis, prophylaxis and treatment are discussed with the help of a vast literature, including the most recent contributions on the subject. Among the atypical forms of the disease, the author mentions what he calls the "cervicoplegica" syndrome, which was described by the eminent Brazilian pediatrician, Fernandes Figueira, many years ago. The Kenny treatment is also discussed, but the author refuses to give a definite statement as to its value until there has been more experience with its use in Brazil.

For its variety, its good bibliographic sources and its clear exposition, as well as for the great clinical experience of the author, this book may prove of interest to any one concerned with children. At the same time it shows the increasing development of pediatrics in Brazil.

Plaster of Paris Technic. By E. O. Geckeler, M.D. Price, $3.00. Pp. 220, with 208 illustrations. Baltimore: The Williams & Wilkins Company, 1944.

This book is an excellent treatise on the use of plaster of paris, and it should prove of great value to doctors, nurses and students.

It takes up in detail the forms of plaster used in surgery, telling how the bandages are made. It then explains the general technic of the use of plaster; this is the chapter every hospital nurse should read.

Next, the application of plaster is described, wi explanation of plaster splints, padding, reenforce molds, etc., and of the errors and difficulties t overcome, such as buckling of casts, too tight and too rapid or too slow setting of the plaster. the use of pattern plaster is explained.

The succeeding three chapters tell how to apply to the different parts of the body, beginning wit spine and continuing with the upper and the l extremities and the pelvis.

A chapter on plaster of paris in war surgery pr the use of casts for transportation. It tells abou application of plaster to various joints and exp its use in the treatment of compound fracture, o myelitis, inflammation, injury of the soft tissue burns.

Chapter XII, on follow-up care, is particularly this chapter should be read and digested by every who assumes the ability to apply casts, and "his is legion."

The 208 illustrations are excellent: they depict only good casts but bad ones, such as the one f the Florida furniture advertisement.

The book is well put together and attractive. T are a number of typographic errors, which should eliminated in the next edition. The description figure 141 is in error. As in the Roger Anderson leg traction splint, the long plaster is placed on sound (left) limb; the short plaster, for pull, on fractured limb. The latter cast, by the way, has b abandoned by Dr. Anderson for the Kirschner direct skeletal pull, and rightly so, because of the al invariable production of pressure sores on the heel, foot or the malleoli, or on all.

One more slight suggestion: The illustrations foot casts should show the foot at right angles to leg—the position recommended by the author. T should not show foot drop. This should be rou procedure. If for any reason I use a plantar fle cast, I write on the cast in indelible purple pen "This cast was put in foot-drop position on purpo

The author is to be congratulated for publishing a long-needed book.

Rebel Without a Cause.—By Robert M. Lind Ph.D. Price, $4.00. Pp. 310, with no illustrati New York: Grune & Stratton, Inc., 1944.

After a brief description of the clinical syndro known as psychopathic personality the author descri in detail the psychoanalysis of a criminal psycho by means of hypnosis. By hypnoanalysis the writer able to complete the analysis in forty-six hours. demonstrated that in this case the criminal beha of the patient was of a compulsive nature and caused by anxieties which went back to the time w he was less than 1 year of age. The patient brought to understand that he was a psychopathic p sonality, and the reason for his condition was explai to him. He was made to see that he did not have continue his compulsive criminal behavior.

n his summary of the book the author points out t crime is behavior that is motivated not only by ial but by intraindividual forces. "It is precipitated sociologic situations, perhaps, but it is an individual ression that arises from secret motives or wishes t lie buried deep within the personality."

This book is intensely interesting and is well written. should give the pediatrician food for thought and rease his feeling of responsibility in the supervision the mental health of children.

itrosedimentatión—su aplicación en la clínica. By Alberto Chattás, M.D. Pp. 137, with 15 illustrations. Buenos Aires: Salvat Editores, 1943.

This monograph, written in Spanish, contains a history of the procedure, the methods and the laboratory and clinical technic of determining the rate of sedimentation of the red cells and shows how the determinations are of value in diagnosing various diseases. The book is well organized and profusely illustrated.

Vademecum: Tratamiento del parasitismo intestinal. By Dr. Pedro Kouri and Dr. Jose G. Basnuevo. Vol. 1. Pp. 122, with 19 illustrations. Habana, Cuba: Laboratories Kuba, 1944.

This work, written in Spanish, describes the life cycle of the helminths as they are found in human beings in Cuba and in Central America. The causation and cure of helminthism are also discussed. The book is well written, concise and profusely illustrated, making an excellent pocket reference.

Directory of Pediatric Societies*

INTERNATIONAL

International Association of Preventive Pediatrics

President: Prof. S. Monrad, Dronning Louises Børnehospital, Copenhagen, Denmark.
Secretary: Dr. Daniel Oltramare, 15 Rue Lévrier, Geneva, Switzerland.

International Congress of Pediatrics

President: Dr. Henry F. Helmholz, Mayo Clinic, Rochester, Minn.
Secretary-Treasurer: Dr. Charles F. McKhann, University Hospital, Ann Arbor, Mich.
Canadian Committee:
Chairman: Dr. Alan Brown, Hospital for Sick Children, 67 College St., Toronto.
Secretary: Dr. H. P. Wright, 1509 Sherbrooke St. W., Montreal.
Place: Boston. Time: Postponed indefinitely.

International Congress for the Protection of Infancy

Secretary: Prof. G. B. Allaria, Corso Bramante 29, Torino 120, Italy.

FOREIGN

Argentine Pediatric Society of Buenos Aires

President: Dr. Martin Ramón Arana, 1809 Rodriguez Peña, Buenos Aires.
General Secretary: Dr. Alfredo Larguia, Cerrito 1179, Buenos Aires.

Associação Paulista de Medicina, Section on Pediatrics

President: Dr. Vicente Laro.
First Secretary: Dr. Armando de Arruda Sampalo.
Second Secretary: Dr. Luiz Augusto de Toledo, Av. Brigadeiro Luiz Antonio 393, 1° Andar, São Paulo, Brazil.
Time: Twelfth of every month, 8:30 p. m.

British Paediatric Association

President: Prof. L. G. Parsons, 58 Calthorpe Rd., Five Ways, Birmingham.
Secretary: Dr. Donald Paterson, 27 Devonshire Pl., London, W. 1.

Danish Pediatric Society

President: Dr. E. Lenstrup, Copenhagen.
Secretary: Dr. E. Gjørup, Dronning Louises Børnehospital, Copenhagen.

Nederlandische Vereeniging voor Kindergeneeskunde

President: Dr. J. H. G. Carstens, Servaasbolwerk 14a, Utrecht.
Secretary: Dr. R. P. van de Kasteele, Laan van Poot 340, 's Gravenhage.
Place: Different places. Time: Three times a year.

Paediatrický Spolok na Slovensku

President: Dr. A. J. C. Chura, Lazaretská 11, Bratis
Secretary: Dr. P. Rados, Lazaretská 6, Bratislava
Place: Pediatric Clinic, University Bratislava. T
Six times year.

Royal Society of Medicine, Section for the Study of Disease in Children

President: Dr. E. A. Cockayne, 98 Harley St., Lon
W. 1, England.
Secretary: Dr. R. Lightwood, 86 Brook St., Lon
W. 1, England.
Place: 1 Wimpole St., London. Time: Fourth Fri
of each month, 4:15 p. m.

Palestine Jewish Medical Association, Sect of Physicians of Children's Diseases

President: Prof. S. Rosenbaum, 26 Bialkstr., Tel A
Secretary: Dr. A. Brünn, 9 Maazestre, Tel Aviv.

Sociedad Cubana de Pediatria

President: Dr. Angel A. Aballí Arellano, 17 No.
Vedado, Habana.
Secretary: Dr. Julio G. Cabrera Calderin, Hosp
Mercedes L y 21 (Vedado), Box 2430, Habana.
Place: Cátedra de Clinica Infantil, Hospital Merce
Habana. Time: Last Wednesday of every month.

Sociedad Mexicana de Pediatria

President: Dr. Fernando López Clares, 12/a. Med
191, Mexico.
Secretary: Dr. Jesus Gómez Pagola, Versalles
Mexico.

Sociedad Venezolana de Puericultura y Pedia

President: Dr. E. Santos Mendoza.
Secretary: Dr. P. Oropeza, Hospital de Niños, Cara

Société de Pédiatrie de Paris

President: Dr. B. Weill-Hallé, 49 Avenue Raym
Poincaire, Paris, France.
Secretary: Dr. Jean Hallé, 10 bis Rue Pré aux Cle
Paris, France.
Place: Hôpital des Enfants Maladies, 49 Rue de Sèv
Time: 4:30 p. m., third Thursday of every mon

Uruguyan Society of Pediatrics

President: Dr. Jose Alberto Praderi, Eduardo Acev
1132, Montevideo.
Secretary: Dr. Alfredo Ramon Guerra, Paysandú &
Montevideo.

NATIONAL

American Medical Association, Scientific Assembly, Section on Pediatrics

Chairman: Dr. John Aikman, 184 Alexander S
Rochester, N. Y.
Secretary: Dr. Gilbert J. Levy, 188 S. Bellevue Blv
Memphis, Tenn.
In compliance with the request of the Office of Defe
Transportation and in the interest of the national w
effort a meeting will not be held in 1945.

*Secretaries of societies are requested to furnish the information necessary to make this list complete and to keep it up to date.

AMERICAN ACADEMY OF PEDIATRICS

ident: Dr. Joseph S. Wall, 1864 Wyoming Ave. W., Washington, D. C.
etary: Dr. Clifford G. Grulee, 636 Church St., vanston, Ill.

AMERICAN HOSPITAL ASSOCIATION, CHILDREN'S HOSPITAL SECTION

irman: Dr. Joelle C. Hiebert, 299 Main St., Lewis-n, Maine.
etary: Dr. W. Franklin Wood, McLean Hospital, Waverly, Mass.

AMERICAN PEDIATRIC SOCIETY

ident: Dr. James L. Gamble, 300 Longwood Ave., oston.
etary-Treasurer: Dr. Hugh McCulloch, 325 N. uclid Ave., St. Louis.

ANADIAN SOCIETY FOR THE STUDY OF DISEASES OF CHILDREN

ident: Dr. R. R. Struthers, 906 Drummond Medical dg., Montreal.
etary-Treasurer: Dr. Elizabeth Chant Robertson, ospital for Sick Children, Toronto.

SOCIETY FOR PEDIATRIC RESEARCH

ident: Dr. Edward M. Bridge, 219 Bryant St., uffalo, N. Y.
etary: Dr. Mitchell I. Rubin, 1740 Bainbridge St., hiladelphia 46.

SECTIONAL

INTERMOUNTAIN PEDIATRIC SOCIETY

ident: Dr. Eugene Smith, 385-24th St., Ogden, tah.
etary-Treasurer: Dr. W. C. Cheney, 837 Boston dg., Salt Lake City.
e: Salt Lake City General Hospital. Time: First hursday of each month, 8 p. m.

NEW ENGLAND PEDIATRIC SOCIETY

ident: Dr. Warren R. Sisson, 319 Longwood Ave., oston.
etary-Treasurer: Dr. James Marvin Baty, 1101 eacon St., Brookline, Mass.
e: Boston Medical Library. Time: Four meetings year, occurring from September to May.

NORTH PACIFIC PEDIATRIC SOCIETY

ident: Dr. M. L. Bridgeman, 1020 S. W. Taylor t., Portland, Ore.
etary: Dr. C. G. Ashley, 833 S. W. 11th Ave., ortland, Ore.

NORTHWESTERN PEDIATRIC SOCIETY

ident: Dr. Arild E. Hansen, University of Minne-ta, Minneapolis.
etary-Treasurer: Dr. Albert V. Stoesser, 205 W. niversity Hospital, Minneapolis.
e: Minneapolis, St. Paul, Duluth and Rochester. ime: January, April, July and October.

ROCKY MOUNTAIN PEDIATRIC SOCIETY

ident: Dr. G. R. Fisher, 23 E. Pikes Peak Ave., olorado Springs, Colo.
etary: Dr. Joseph H. Lyday, 1850 Gilpin St., enver.

SOUTHERN MEDICAL ASSOCIATION, SECTION OF PEDIATRICS

Chairman: Dr. William Weston Jr., 1428 Lady St., Columbia, S. C.
Secretary: Dr. Angus McBryde, 604 W. Chapel Hill St., Durham, N. C.

STATE

ALABAMA PEDIATRIC SOCIETY

President: Dr. Amas Gipson, 948 Forrest Ave., Gadsen.
Secretary-Treasurer: Dr. Ruth Berrey, 2021-6th Ave. N., Birmingham.

ARIZONA PEDIATRIC SOCIETY

President: Dr. Vivian Tappan, San Clemente, Tucson.
Secretary: Dr. Hilda Kroeger, Arizona State Health Dept. (Maternal and Child Welfare Division), Phoenix.

ARKANSAS STATE PEDIATRIC ASSOCIATION

Chairman: Dr. C. B. Billingsley, 1425 N. 11th St., Fort Smith.
Secretary: Dr. R. E. Weddington, 1425 N. 11th St., Fort Smith.

CALIFORNIA STATE MEDICAL SOCIETY, SECTION ON PEDIATRICS

Chairman: Dr. William C. Deamer, University of California Hospital, San Francisco.
Secretary: Dr. Charles W. Leach, 2000 Van Ness Ave., San Francisco.

FLORIDA STATE PEDIATRIC SOCIETY

President: Dr. Ludo Von Meysenbug, Box 3356, Daytona Beach.
Secretary: Dr. Robert Blessing, 409 Blount Bldg., Ft. Lauderdale.
Place: Concurrent with state association meeting at time of convention.

GEORGIA PEDIATRIC SOCIETY

President: Dr. T. F. Davenport, 104 Ponce de Leon Ave. N. E., Atlanta.
Secretary-Treasurer: Dr. Don F. Cathcart, 478 Peachtree St. N. E., Atlanta.

HEZEKIAH BEARDSLEY PEDIATRIC CLUB OF CONNECTICUT

President: Dr. Edward T. Wakeman, 129 Whitney Ave., New Haven.
Secretary: Dr. Herman Yannet, Southbury Training School, Southbury.
Time: Three meetings a year.

ILLINOIS STATE MEDICAL SOCIETY, SECTION ON PEDIATRICS

Chairman: Dr. Craig D. Butler, 715 Lake St., Oak Park.
Secretary: Dr. A. J. Fletcher, 139 N. Vermilion, Danville.

INDIANA STATE PEDIATRIC SOCIETY

President: Dr. K. T. Knode, 1105 E. Jefferson Bldg., South Bend.
Secretary-Treasurer: Dr. Mathew Winters, 621 Hume Mansur Bldg., Indianapolis.
Time: Two meetings a year.

IOWA PEDIATRIC SOCIETY

President: Dr. Mark L. Floyd, Children's Hospital, Iowa City.
Secretary-Treasurer: Dr. James Dunn, Davenport Bank Bldg., Davenport.

MEDICAL SOCIETY OF STATE OF NEW YORK, SECTION ON PEDIATRICS

Chairman: Dr. A. Clement Silverman, 608 E. Genesee St., Syracuse.
Secretary: Dr. Albert G. Davis, 307 Gas and Electric Bldg., Utica.

MEDICAL SOCIETY OF THE STATE OF PENNSYLVANIA, PEDIATRIC SECTION

Chairman: Dr. Elwood W. Stitzel, 403 Central Trust Bldg., Altoona, Pa.
Secretary: Dr. P. F. Lucchesi, Philadelphia Hospital, Philadelphia.

MICHIGAN STATE MEDICAL SOCIETY, PEDIATRIC SECTION

Chairman: Dr. Charles F. McKhann, University Hospital, Ann Arbor.
Secretary: Dr. Mark F. Osterlin, Central Michigan Children's Clinic, Traverse City.

MISSISSIPPI STATE PEDIATRIC SOCIETY

President: Dr. Harvey F. Garrison Jr., 315 E. Capitol Pl., Jackson.
Secretary: Dr. Guy Verner, 126 N. Congress St., Jackson.

NEBRASKA PEDIATRIC SOCIETY

President: Dr. John L. Gedgoud, University of Nebraska Hospital, Omaha.
Secretary-Treasurer: Dr. Gerald C. O'Neil, 640 City National Bank Bldg., Omaha.
Place: As announced by committee. Time: Third Thursday of each month from October to June, inclusive. Dinner at 6 p. m.

NEW HAMPSHIRE PEDIATRIC SOCIETY

President: Dr. MacLean J. Gill, 14 N. State St., Concord.
Secretary-Treasurer: Dr. Ursula G. Sanders, 46 Pleasant St., Concord.
Time: Twice yearly.

NORTH CAROLINA PEDIATRIC SOCIETY

President: Dr. Arthur H. London, 1105 W. Main St., Durham.
Secretary: Dr. Jay M. Arena, 604 W. Chapel Hill St., Durham.

OKLAHOMA STATE PEDIATRIC SOCIETY

President: Dr. Ben H. Nicholson, 301 N. W. 12th St., Oklahoma City.
Secretary: Dr. Luvern Hays, 108 W. 6th St., Tulsa.
Place: Oklahoma Club. Time: 6:30 p. m., fourth Friday of each alternate month from September to May, inclusive.

SOUTH CAROLINA PEDIATRIC SOCIETY

President: Dr. Lonita Boggs, 301 E. Coffee St., Greenville.
Secretary-Treasurer: Dr. Hilla Sheriff, Wade Hampton Office Bldg., Columbia.

TEXAS PEDIATRIC SOCIETY

President: Dr. F. H. Lancaster, 4409 Fannin St., Houston.
Secretary-Treasurer: Dr. John E. Ashby, 3610 Fairmount Ave., Dallas.

VIRGINIA PEDIATRIC SOCIETY

President: Dr. L. E. Sutton Jr., Medical College pital, Richmond.
Secretary: Dr. Emily Gardner, 1100 W. Frankl Richmond.

WEST VIRGINIA STATE MEDICAL SOCIETY, SECTION ON PEDIATRICS

President: Dr. Andrew Amick, 1021 Quarrie Charleston.
Secretary: Dr. A. A. Shawkey, Professional Charleston.

LOCAL

ACADEMY OF MEDICINE OF CLEVELAND PEDIATRIC SECTION

Chairman: Dr. J. D. Nourse, 10515 Carnegie Cleveland.
Secretary: Dr. I. B. Silber, 10465 Carnegie Cleveland.
Place: Cleveland Medical Library Bldg. Time: tober, December, February and April.

ACADEMY OF MEDICINE, TORONTO, SECTION OF PEDIATRICS

President: Dr. I. Nelles Silverthorne, 170 St. G St., Toronto, Canada.
Secretary: Dr. G. P. Hamblin, 2333 Bloor St Toronto, Canada.

BRONX PEDIATRIC SOCIETY

President: Dr. Harry J. Cohen, 1975 Walton New York.
Secretary: Dr. Walter Levy, 12 E. 88th St., New Y
Place: Concourse Plaza Hotel, 161st St. and G Concourse. Time: Second Wednesday of each m except June, July, August and September.

BROOKLYN ACADEMY OF PEDIATRICS

President: Dr. Kenneth G. Jennings, 159 Midwood Brooklyn.
Secretary: Dr. Joseph Battaglia, 713 Bushwick Brooklyn.
Place: Granada Hotel. Time: Fourth Wednesd each month except May, June, July, August September.

BUFFALO PEDIATRIC SOCIETY

President: Dr. A. Wilmot Jacobsen, 187 Bryant Buffalo, N. Y.
Secretary: Dr. Richard A. Downey, 786 Forest Buffalo, N. Y.
Place: Children's Hospital, 219 Bryant St. Time: p. m., first Monday of each month from Septe to June.

CENTRAL NEW YORK PEDIATRIC CLUB

President: Dr. Edward J. Wynkoop, 501 James Syracuse.
Secretary: Dr. Frank J. Williams, 58 S. Swan Albany.
Places: Various cities in New York. Time: T Tuesday of April and September.

CHICAGO PEDIATRIC SOCIETY

President: Dr. Morley D. McNeal, 2 N. Sheridan Highland Park, Ill.
Secretary: Dr. Henry G. Poncher, 1819 W. Polk Chicago.
Place: Children's Memorial Hospital, 710 Fulle Ave. Time: Third Tuesday of each month, Oct to May, inclusive.

Cincinnati Pediatric Society

ident: Dr. Lloyd K. Felter, 3144 Jefferson Ave., ncinnati.
etary: Dr. T. Selkirk, 3530 Reading Rd., Cincinnati.
e: Children's Hospital, Elland Ave., Cincinnati.
me: On call.

Dallas Pediatric Society

ident: Dr. Robert A. Knox, 3701 Fairmount Ave., llas 4, Texas.
etary-Treasurer: Dr. Gladys J. Fashena, 4585 Bel- t Pl., Dallas 4, Texas.
e: Children's Medical Center. Time: 1 p. m., second d fourth Saturdays of each month.

Detroit Pediatric Society

ident: Dr. John J. Pollack, 650 Maccabees Bldg., troit, Mich.
etary: Dr. Philip J. Howard, 2799 W. Grand Blvd., troit, Mich.
e: Wayne County Medical Society. Time: 8:30 m., first Wednesday of each month from October June, inclusive.

Fulton County Medical Society, Pediatrics Section (Atlanta, Ga.)

rman: Dr. Don F. Cathcart, 478 Peachtree St. E., Atlanta.
etary: Dr. Harry Lange, 478 Peachtree St. N. E., lanta.
e: Academy of Medicine, 38 Prescott St. N. E.
me: Second Thursday of each month from October April, 8 p. m.

Houston Pediatric Society

ident: Dr. Raymond Cohen, 2300 Caroline St., ouston, Texas.
etary: Dr. Betty Moody, 526 Richmond Rd., ouston, Texas.
e: College Inn, Houston. Time: Fourth Monday each month.

Kansas City (Missouri) Pediatric Society

ident: Dr. Edwin H. Schorer, 1103 Grand Ave., ansas City.
etary: Dr. H. E. Petersen, Kirkpatrick Bldg., St. seph, Mo.
e: Kansas City General Hospital. Time: On call.

Los Angeles County Medical Association, Pediatric Section

ident: Dr. Milo B. Brooks, 1033 Gayley Ave., West s Angeles.
etary-Treasurer: Dr. Elena Boder, 1830½ Lucille ve., Los Angeles 26.
e: Los Angeles County Medical Headquarters, 1925 ilshire Blvd. Time: Second Monday of February, pril, June, October and December.

Medical Society of the County of Kings and the Academy of Medicine of Brooklyn, Pediatric Section

ident: Dr. Abraham M. Litvak, 1145 Eastern Park- ay, Brooklyn.
etary: Dr. Harold Levy, 750 St. Marks Ave., rooklyn.
e: 1313 Bedford Ave., Brooklyn. Time: 9:00 p. m., urth Monday of each month, October to April, clusive.

Medical Society of the County of Queens, Inc., Section on Pediatrics

Chairman: Dr. Meyeron Coe, 217-02–91st Ave., Queens Village, N. Y.
Secretary-Treasurer: Dr. Edith A. Mittell, 144–38th Ave., Flushing, N. Y.
Place: Queens County Medical Bldg., Forest Hills, N. Y. Time: Third Monday of October, January, March and May.

Medical Society of the District of Columbia, Section on Pediatrics

President: Dr. Harry A. Spigel, 2647 Connecticut Ave., Washington, D. C.
Secretary-Treasurer: Dr. Perry W. Gard, 2520 Woodley Rd., Washington, D. C.
Place: Medical Society Bldg., 1718 M St. N. W. Time: 8 p. m., fourth Thursday of every month.

Memphis Pediatric Society

President: Dr. F. T. Mitchell, 376 S. Bellevue Ave., Memphis, Tenn.
Secretary-Treasurer: Dr. Harry Jacobson, 1193 Madison Ave., Memphis, Tenn.
Place: John Gaston Hospital. Time: Quarterly.

Milwaukee Pediatric Society

President: Dr. M. G. Peterman, 411 E. Mason St., Milwaukee 2.
Secretary-Treasurer: Dr. B. J. Malnekoff, 3213 N. Marietta Ave., Milwaukee.
Place: Milwaukee Athletic Club. Time: Second Wednesday of each alternate month, beginning with February.

New York Academy of Medicine, Section of Pediatrics

Chairman: Dr. Howard Craig, 175 E. 79th St., New York.
Secretary: Dr. Alfred E. Fischer, 73 E. 90th St., New York.
Place: New York Academy of Medicine, 2 E. 103d St. Time: Second Thursday of each month from October to May, inclusive, 8:30 p. m.

Northern California Affiliates

President: Dr. Crawford Bost, 400 Post St., San Francisco.
Secretary: Dr. William A. Reilly, 384 Post St., San Francisco.
Time: Second Thursday of September, November, January, March and May.

Oklahoma City Pediatric Society

President: Dr. William M. Taylor, 1200 N. Walker St., Oklahoma City.
Secretary: Dr. G. R. Felts, 625 N. W. 10th St., Oklahoma City.
Place: Oklahoma Club. Time: Third Thursday of each month.

Philadelphia Pediatric Society

President: Dr. Carl Fischer, Greene and Coulter Sts., Germantown, Philadelphia.
Secretary: Dr. Sherman Little, 1740 Bainbridge St., Philadelphia.
Place: College of Physicians, 19 S. 22d St. Time: Second Tuesday in January, March, May and November.

Pittsburgh Pediatric Society

President: Dr. John D. Sturgeon Jr., 22 N. Gallatin Ave., Uniontown, Pa.
Secretary-Treasurer: Dr. C. J. Stoecklein, Medical Arts Bldg., Pittsburgh.
Place: Pittsburgh Academy of Medicine. Time: Second Friday, alternate month from October to June, inclusive.

Richmond Pediatric Society

President: Dr. Stanley Meade, 913 Floyd Ave., Richmond, Va.
Secretary-Treasurer: Dr. Louise Galvin, 214 S. Boulevard, Richmond, Va.
Place: Richmond Academy of Medicine, 1200 E. Clay St. Time: 8 p. m., third Thursday of each month, except June, July and August.

Rochester Pediatric Society

President: Dr. Herbert Soule, 122 Rutgers St., Rochester, N. Y.
Secretary-Treasurer: Dr. Jerome Glaser, 300 S. Goodman St., Rochester, N. Y.
Place: Rochester Academy of Medicine or arrangement by program committee. Time: Third Friday of each month from October to May.

St. Louis Pediatric Society

President: Dr. Jerome Diamond, 508 N. Grand Ave., St. Louis.
Secretary-Treasurer: Dr. Mary A. McLoon, 408 Humboldt Bldg., St. Louis.
Place: St. Louis Medical Society Bldg. Time: First Friday of each month from November to June.

Seattle Pediatric Society

President: Dr. Frederick B. Joy, Stimson Bldg., Sea
Secretary: Dr. Sherod M. Billington, Medical D
Bldg., Seattle.
Place: College Club. Time: Third Friday of
month from September to June at 6:30 p. m.

Southwestern Pediatric Society

President: Dr. Jeanette Harrison, 1136 W. 6th
Los Angeles.
Secretary: Dr. Henry F. Gallagher, 1930 Wils
Blvd., Los Angeles.
Place: Jonathan Club of Los Angeles. Time: F
Wednesday in January, March, May, September
November.

University of Michigan Pediatric and Infectious Disease Society

President: Dr. Campbell Harvey, 35 W. Huron
Pontiac, Mich.
Secretary: Dr. Harry A. Towsley, University of M
igan, Department of Pediatrics and Communic
Diseases, Ann Arbor, Mich.

Westchester County Medical Society, Pediatric Section (New York)

President: Dr. John B. Ahouse, 27 Ludlow St., Yonk
N. Y.
Secretary-Treasurer: Dr. Elvira Ostlund, 64 High
Rd., Rye, N. Y.
Place: Grasslands Hospital, Valhalla, N. Y. T
Third Thursday in October, December, February
April.

THE AMERICAN JOURNAL OF DISEASES OF CHILDREN is published by the American Medical Association as a medium for the advancement of knowledge of the diseases of children and for the publication of scientific investigation in this field.

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AMERICAN MEDICAL ASSOCIATION

535 North Dearborn Street **CHICAGO 10**

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